TESTING
No. L2264

SAR TEST REPORT

Product Name	HUAWEI MediaPad M1 8.0
Model Name	S8-301u
FCC ID	QISS8-301U
Client	Huawei Technologies Co., Ltd.
Manufacturer	Huawei Technologies Co., Ltd.
Date of issue	April 11, 2014

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC 47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **ANSI C95.1, 1992:** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528™-2003:** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques. **RSS-102 Issue 4 March 2010:** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands). **KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03:** SAR Measurement Requirements for 100 MHz to 6 GHz **KDB 447498 D01 General RF Exposure Guidance v05r02:** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies **KDB 941225 D01 SAR test for 3G devices v02:** SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA **KDB 941225 D02 HSPA and 1x Advanced v02r02** SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced **KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE v01:** Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE **KDB 616217 D04 SAR for laptop and tablets v01r01:** SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers **KDB 648474 D04 Handset SAR v01r02** SAR Evaluation Considerations for Wireless Handsets **KDB 248227 D01 SAR meas for 802 11 a b g v01r02:** SAR Measurement Procedures for 802.11a/b/g Transmitters.
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards for the tested bands only. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

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1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electronic report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.4. Manufacturer Information

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Address: Shenzhen
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P.R.China

1.5. Information of EUT

General Information

Device Type:	Portable Device	
Exposure Category:	Uncontrolled Environment / General Population	
State of Sample:	Prototype Unit	
IMEI:	864220020000369	
Hardware Version:	SH1S8301LM	
Software Version:	S8-301uV100R001C001	
Antenna Type:	Internal Antenna	
Device Operating Configurations:		
Tested Mode(s):	GSM 850/ GSM 1900; UMTS Band II/ UMTS Band V; Bluetooth; WiFi(802.11b/g/n HT20/HT40);	
Test Modulation:	(GSM)GMSK; (UMTS)QPSK; (WIFI)BPSK	
Device Class:	B	
HSUPA UE Category:	6	
HSPA+ Downlink UE Category:	14	
DC-HSDPA UE Category:	24	
GPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
EGPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
Power Class:	GSM 850: 4	
	GSM 1900: 1	
	UMTS Band II: 3	
	UMTS Band V: 3	
Power Level:	GSM 850: tested with power level 5	
	GSM 1900: tested with power level 0	
	UMTS Band II: tested with power control all up bits	
	UMTS Band V: tested with power control all up bits	
Test Channel: (Low - Middle - High)	128 -190 - 251 (GSM 850) 512 - 661 - 810 (GSM 1900) 9262 - 9400 - 9538 (UMTS Band II)	

	4132 - 4183 - 4233 (UMTS Band V) 0-39-78 (Bluetooth) 0-19-39 (Bluetooth 4.0) 1-6-11 (802.11b/g/n HT20)		
Test Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	UMTS Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	UMTS Band V	826.4 ~ 846.6	871.4 ~ 891.6
	Bluetooth	2402 ~ 2480	2402 ~ 2480
	Bluetooth 4.0	2402 ~ 2480	2402 ~ 2480
	WIFI	2412 ~ 2462	2412 ~ 2462

Equipment Under Test (EUT) has a GSM/UMTS antenna that is used for Tx/Rx, the second is BT/BT4.0/WIFI antenna that can be used for Tx/Rx.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. The Maximum Reported SAR_{1g}

Head SAR Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
GSM 850	Right, cheek	190/836.6	0.594	0.719
GSM 1900	Right, cheek	810/1909.8	0.314	0.356
UMTS Band II	Right, cheek	9400/1880	0.316	0.320
UMTS Band V	Right, cheek	4183/836.6	0.503	0.648
WiFi(802.11b)	Right, cheek	6/2437	0.00583	0.006

Body SAR Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
3Txslots GPRS 850	Test Position 1/ Back side	128/824.2	1.190	1.408
2Txslots GPRS 1900	Test Position 1/ Back side	512/1850.2	1.030	1.084
UMTS Band II	Test Position 1/ Back side	9538/1909.8	1.040	1.352
UMTS Band V	Test Position 1/ Back side	4183/836.6	1.150	1.481
WiFi(802.11b)	Test Position 1/ Back side	1/2412	0.939	1.190

1.7. Maximum Conducted Power of Each Tested Mode

Mode		Maximum Burst Conducted Power (dBm)	Maximum Average Power (dBm)
GSM 850	GSM	32.74	23.71
	GPRS(GMSK), 3 Txslots	28.44	24.18
	EGPRS(GMSK), 3 Txslots	28.44	24.18
GSM 1900	GSM	30.48	21.45
	GPRS(GMSK), 2 Txslots	28.84	22.82
	EGPRS(GMSK), 2 Txslots	28.84	22.82

Mode	Maximum Conducted Power (dBm)
UMTS Band II	23.97
UMTS Band V	22.90
WiFi(802.11b)	14.18

Note: The detail Power refers to Table 14 (Conducted Power Measurement Results).

1.8. Test Date

The test performed from March 10, 2014 to March 20, 2014.

2. SAR Measurements System Configuration

2.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

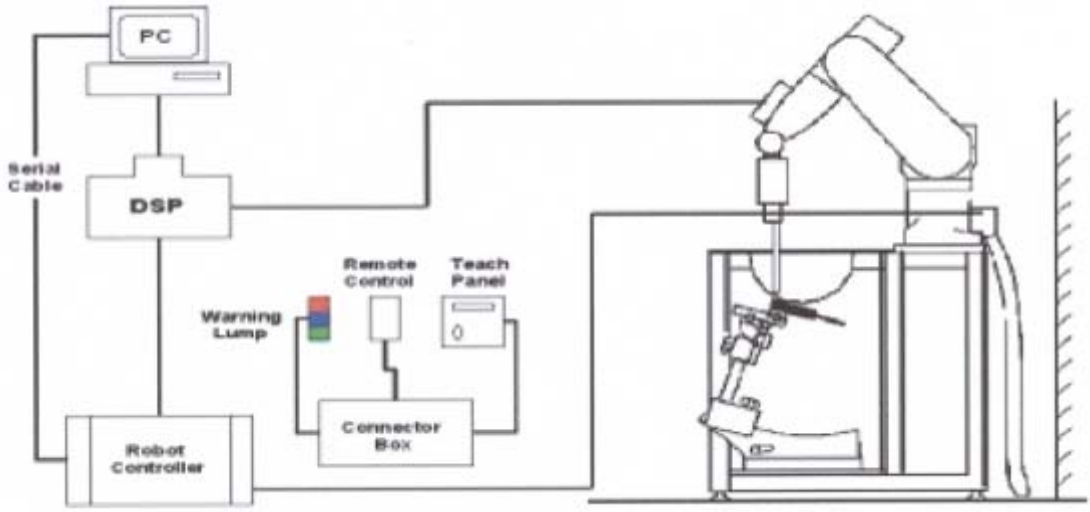


Figure 1. SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

2.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

Figure 2.EX3DV4 E-field Probe

Figure 3. EX3DV4 E-field probe

2.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$\mathbf{SAR} = \mathbf{C}\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.
Or

$$\mathbf{SAR} = \frac{|E|^2 \sigma}{\rho}$$

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m3).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.

Material: POM, Acrylic glass, Foam

2.3.2. Phantom

Phantom for compliance testing of handheld andbody-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can beintegrated into our standard phantom tables. A cover prevents evaporation ofthe liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG do simetric probes and dipoles.

Shell Thickness	2±0.2 mm
Filling Volume	Approx. 30 liters
Dimensions	190×600×0 mm (H x L x W)

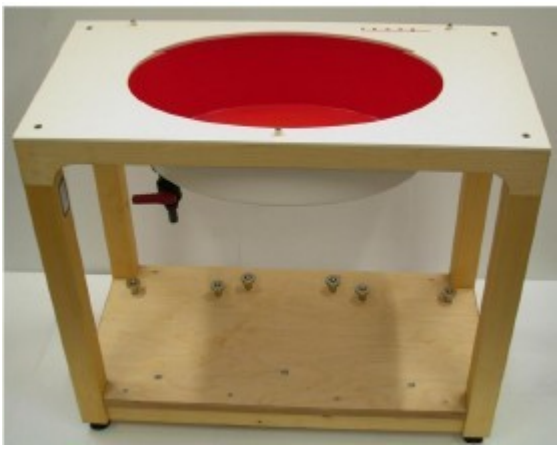


Figure 4.ELI4 Phantom

2.4. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

- Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search
• extrapolation
• boundary correction
• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm) $\Delta z_{zoom}(n)$	Minimum Zoom Scan Volume (mm) (x,y,z)
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≥ 22

2.5. Data Storage and Evaluation

2.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

2.5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot c\,f / d\,c\,p_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot})^2 \cdot \sigma / (\rho \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

. = conductivity in [mho/m] or [Siemens/m]

. = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m

3. Laboratory Environment

Table 2: The Requirements of the Ambient Conditions

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The table 3 and table 4 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 3: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=41.5 σ=0.9

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.7
Glycol	36.8
Salt	0.5
Dielectric Parameters Target Value	f=2450MHz ε=39.20 σ=1.80

Table 4: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=55.2 σ=0.97

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

4.2. Tissue-equivalent Liquid Properties

Table 5: Dielectric Performance of Tissue Simulating Liquid

Frequency	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
835MHz (head)	2014-3-19	21.5	41.4	0.92	41.5	0.90	-0.24	2.22
1900MHz (head)	2014-3-16	21.5	39.6	1.43	40.0	1.40	-1.00	2.14
2450MHz (head)	2014-3-20	21.5	39.1	1.8	39.2	1.80	-0.26	0.00
835MHz (body)	2014-3-20	21.5	55.9	0.98	55.2	0.97	1.27	1.03
1900MHz (body)	2014-3-10	21.5	52.6	1.51	53.3	1.52	-1.31	-0.66
2450MHz (body)	2014-3-19	21.5	52.1	1.99	52.7	1.95	-1.14	2.05

5. System Check

5.1. Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 5.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

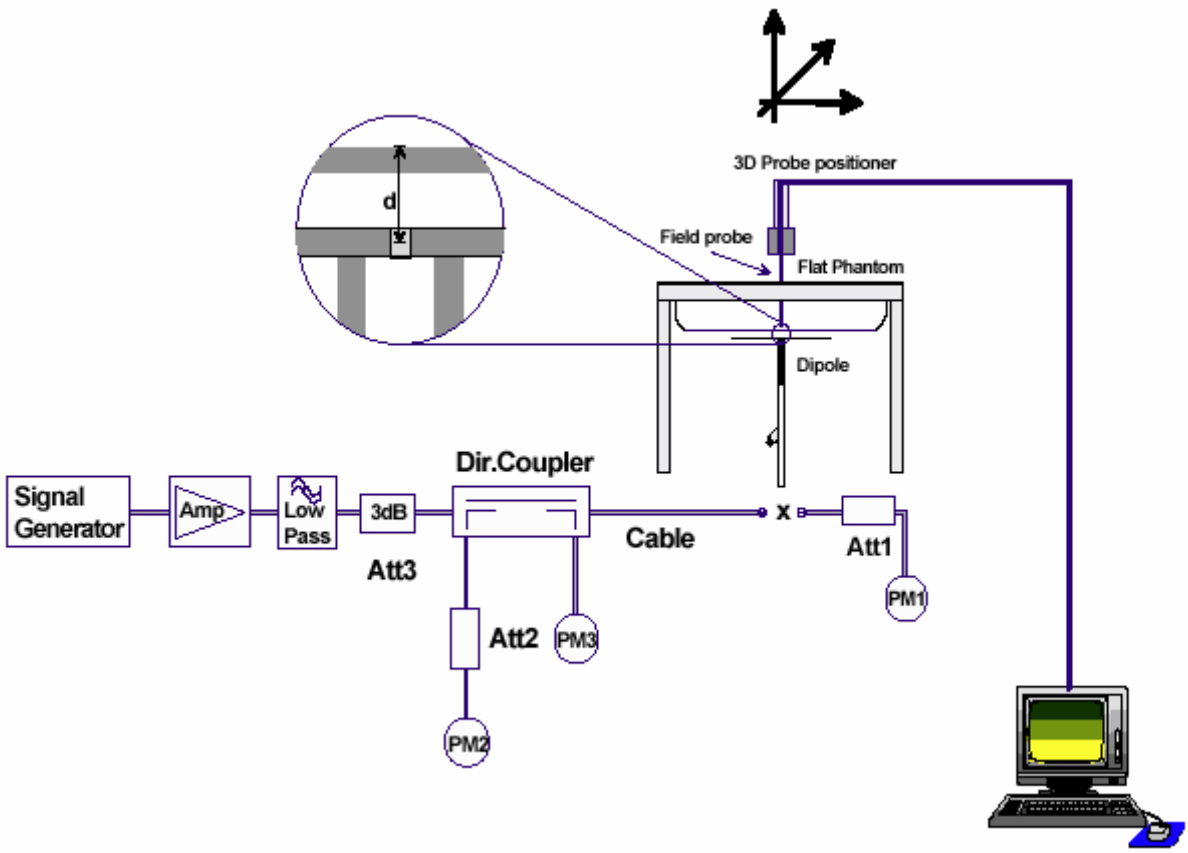


Figure 5. System Check Set-up

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

Dipole D835V2 SN: 4d020				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/26/2011	-27.7	/	52.9	/
8/25/2012	-29.1	5.0%	55.0	2.1Ω
8/24/2013	-26.6	4.1%	55.3	2.4Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/26/2011	-25.1	/	48.7	/
8/25/2012	-24.3	3.2 %	50.6	1.9Ω
8/24/2013	-24.7	1.6%	51.1	2.4Ω

Dipole D1900V2 SN: 5d060				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/31/2011	-22.3	/	52.6	/
8/30/2012	-21.7	2.7%	51.4	1.2Ω
8/29/2013	-21.4	4.2%	50.5	2.1Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/31/2011	-21.3	/	47.3	/
8/30/2012	-20.9	1.9%	45.9	1.4Ω
8/29/2013	-20.4	4.4%	44.8	2.5Ω

Dipole D2450V2 SN: 786				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/29/2011	-25.5	/	55.0	/
8/28/2012	-26.8	5.1%	56.5	1.5Ω
8/27/2013	-26.4	3.5%	56.9	1.9Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/29/2011	-29.0	/	50.4	/
8/28/2012	-29.9	3.1%	52.1	1.7Ω
8/27/2013	-28.2	2.8%	52.7	2.3Ω

5.2. System Check Results

Table 6: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)			
835MHz	2014-3-19	41.4	0.92	21.5	2.44	9.76	9.34	4.50
1900MHz	2014-3-16	39.6	1.43	21.5	9.48	37.92	40.30	-5.91
2450MHz	2014-3-20	39.1	1.80	21.5	13.70	54.8	53.80	1.86

Note：1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

Table 7: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)			
835MHz	2014-3-20	55.9	0.98	21.5	2.52	10.08	9.46	6.55
1900MHz	2014-3-10	52.6	1.51	21.5	9.82	39.28	41.70	-5.80
2450MHz	2014-3-19	52.1	1.99	21.5	13.20	52.80	51.70	2.13

Note：1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

6. Operational Conditions during Test

6.1. General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

6.2. Test Configuration

6.2.1. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power level is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. Since the EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

GSM 850
GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

GSM 1900

GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

6.2.2. UMTS Test Configuration

6.2.2.1. Output power Verification

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all up bits for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, $DPDCH_n$ and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified

6.2.2.2. Head SAR Measurements

SAR for head exposure configurations in voice mode is measured using a 12.2kbps RMC with TPC bits configured to all up bits. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2kbps AMR is less than 1/4 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2kbps AMR with a 3.4 kbps SRB(Signaling radio bearer) using the exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

6.2.2.3. Body SAR Measurements

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all up bits. SAR for other spreading codes and multiple $DPDCH_n$, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and $DPDCH_n$ configuration, are less than 1/4 dB higher than those measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or $DPDCH_n$ using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 $DPDCH_n$ are supported by the DUT, it may be necessary to configure additional $DPDCH_n$ for a DUT using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

6.2.3. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least 1/4 dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc,βd), and HS-DPCCH power offset

parameters(△ACK, △NACK, △CQI)should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 8: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: $\triangle_{ACK}$, $\triangle_{NACK}$ and $\triangle_{CQI}$= 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c$=30/15 ⇔ β_{hs}=30/15*β_c

Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, $\triangle_{ACK}$ and $\triangle_{NACK}$= 8 ($A_{hs=}$30/15) with β_{hs}=30/15*$\beta_{c,}$and $\triangle_{CQI}$= 7 ($A_{hs=}$24/15) with β_{hs}=24/15*$\beta_{c.}$

Note3: CM=1 forβ_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4:For subtest 2 the $\beta_c\beta_d$ ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to β_c=11/15 and β_d=15/15.

Table 9: Settings of required H-Set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload (N_{INF})	Bits	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK

6.2.4. DC-HSDPA Test Configuration

When the maximum average output power of each RF channel with (uplink) HSPA+ or DC-HSDPA active is ≤ ¼ dB higher than that measured without HSPA+ or DC-HSDPA using 12.2 kbps RMC, or the maximum reported SAR for 12.2 kbps RMC without HSPA+ or DC-HSDPA is ≤ 75% of the SAR limit, SAR evaluation for HSPA+ or DC-HSDPA is not required

Configure DC-HSDPA parameters for base station

a) Set up the HSDPA RB Test Mode Parameters

RB Test HS-DSCH Configuration Type = User Defined
RB Test User Defined HS-DSCH MAC entity = MAC-ehs (Note 1)
RB Test User Defined HARQ Processes = 6 (Note 2)
RB Test User Defined UE IR Buffer Allocation = Implicit
RB Test User Defined DC-HSDPA State = On
RB Test Mode DC-HSDPA DPCH Loopback State = On

b) Set up the Serving Cell Parameters

RB Test User Defined 64QAM State =On
RB Test User Defined Active HS-PDSCHs =15
RB Test User Def Transport Block Size Index =62
RB Test User Defined Modulation Type =64QAM
RB Test User Defined Inter-TTI Interval =1

c) Set up the Secondary Serving Cell Parameters

RB Test User Def Secondary Cell 64QAM State =On
RBTM User Def Sec Cell Active HS-PDSCHs = 15
RBTM User Def Sec Cell TB Size Index = 62
RBTM User Def Sec Cell Modulation Type =64QAM
RBTM User Def Sec Cell Inter-TTI Interval = 1

d) Set the HSDPA Conn DL Channel Levels

HSDPA Cell 1 Connected CPICH Level = -8
HSDPA Cell 1 Connected P-CCPCH/SCH Level = -20
HSDPA Cell 1 Connected PICH Level = off
HSDPA Cell 1 Connected DPCH Level = -30
HSDPA Cell 1 Connected HS-PDSCH Level (Sum) = -1 dBm
HSDPA Cell 1 Connected HS-SCCH 1 to 4 Level = -20,-20,off,off
Secondary Cell HSDPA Conn CPICH Level = -8
Secondary Cell HSDPA Conn PCCPCH/SCH Level = -20
Secondary Cell HSDPA Conn PICH Level = off
Secondary Cell HSDPA Conn HS-PDSCHs Lvl (Sum) = -1 dBm
Secondary Cell HSDPA Conn HS-SCCH 1 to 4 Level = -20,-20,off,off

Table 10: HS-DSCH UE category

Table 5.1a: FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI NOTE 1	Total number of soft channel bits	Supported modulations without MIMO operation or dual cell operation	Supported modulations with MIMO operation and without dual cell operation	Supported modulations with dual cell operation
Category 1	5	3	7298	19200	QPSK, 16QAM	Not applicable (MIMO not supported)	Not applicable (dual cell operation not supported)
Category 2	5	3	7298	28800			
Category 3	5	2	7298	28800			
Category 4	5	2	7298	38400			
Category 5	5	1	7298	57600			
Category 6	5	1	7298	67200			
Category 7	10	1	14411	115200			
Category 8	10	1	14411	134400			
Category 9	15	1	20251	172800			
Category 10	15	1	27952	172800			
Category 11	5	2	3630	14400	QPSK		
Category 12	5	1	3630	28800			
Category 13	15	1	35280	259200	QPSK, 16QAM, 64QAM		
Category 14	15	1	42192	259200			
Category 15	15	1	23370	345600	QPSK, 16QAM		
Category 16	15	1	27952	345600			
Category 17 NOTE 2	15	1	35280	259200	QPSK, 16QAM, 64QAM	–	
			23370	345600	–	QPSK, 16QAM	
Category 18 NOTE 3	15	1	42192	259200	QPSK, 16QAM, 64QAM	–	
			27952	345600	–	QPSK, 16QAM	
Category 19	15	1	35280	518400	QPSK, 16QAM, 64QAM		
Category 20	15	1	42192	518400			
Category 21	15	1	23370	345600	-	-	QPSK, 16QAM
Category 22	15	1	27952	345600			
Category 23	15	1	35280	518400			QPSK, 16QAM, 64QAM
Category 24	15	1	42192	518400			

6.2.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.[40]

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E- DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of 3 G device.

Table 11：Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, ΔNACK and Δ_{CQI} = 8 □ A_{hs} = β_{hs}/β_c = 30/15 □ β_{hs}= 30/15 *β_c.
Note 2: CM = 1 for βc/βd =12/15, β_{hs}/β_c =24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-
DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the βc/βd ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the
signaled gain factors for the reference TFC (TF1, TF1) to βc = 10/15 and βd = 15/15.
Note 4: For subtest 5 the βc/βd ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the
signaled gain factors for the reference TFC (TF1, TF1) to βc = 14/15 and βd = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.
Note 6: βed can not be set directly; it is set by Absolute Grant Value.

Table 12: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.
UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)

6.2.6. WIFI Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. The Tx power is set to 12 for 802.11 b mode by software, This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g/n modes are tested on the maximum average output channel;

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

6.3. Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

6.4. Test Positions

6.4.1. Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.
The positions used in the measurements for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

6.4.2. Body Configuration

The overall diagonal dimension of the display section of a tablet is 24 cm > 20 cm, Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. SAR evaluation for the front surface of tablet display screens are generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

6.4.3. SAR test reduction and exclusion guidance

(1) The SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \square \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

(2) The SAR exclusion threshold for distances >50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

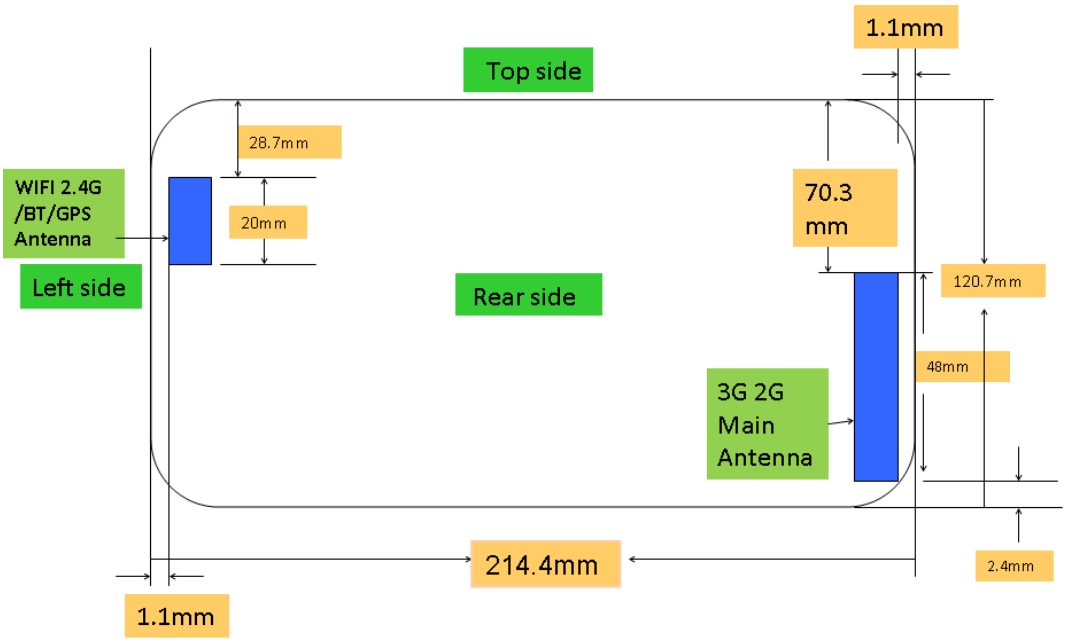
a) at 100 MHz to 1500 MHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · ($f_{(MHz)}$/150)] mW

b) at > 1500 MHz and ≤ 6 GHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) ·10] mW

The location of the antennas inside EUT is shown in ANNEX H:



- Test Position 1: The back surface of the EUT towards to the bottom of the flat phantom. (ANNEX I Picture 13).
  SAR is required for GSM/UMTS/WiFi antenna in this position.
  SAR is not required for BT antenna in this position.
  Test Position 1 Evaluation $_{(GSM\ 850)}$ = $[10^{((29-4.26)/10)}/5] * (0.8488^{1/2})$ =54.88 >3.0
  Test Position 1 Evaluation $_{(GSM\ 1900)}$ = $[10^{((29-6.02)/10)}/5] * (1.9098^{1/2})$ =54 >3.0
  Test Position 1 Evaluation $_{(UMTS\ Band\ II)}$ = $[10^{(24/10)}/5] * (1.9076^{1/2})$ =69.39 >3.0
  Test Position 1 Evaluation $_{(UMTS\ Band\ V)}$ = $[10^{(24/10)}/5] * (0.8466^{1/2})$ =46.22 >3.0
  Test Position 1 Evaluation $_{(WiFi)}$ = $[10^{(14.5/10)}/5] * (2.462^{1/2})$ =8.84 >3.0
  Test Position 1 Evaluation $_{(BT)}$ = $[10^{(1/10)}/5] * (2.480^{1/2})$ =0.40 <3.0

- Test Position 2: The left edge of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 14).
  SAR is required for WIFI antenna in this position.
  SAR is not required for GSM/WCDMA/BT antenna in this position.
  Test Position 2 evaluation $_{(GSM\ 850)}$ = 164+ (213.3-50)*(848.8/150)=1088.1mW=30.37 dBm>(29-4.26) dBm =24.74 dBm (max.power)
  Test Position 2 evaluation $_{(GSM\ 1900)}$ = 109+ (213.3-50)*10=1742mW=32.41 dBm> (29-6.02) dBm =22.98(max.power)
  Test Position 2 evaluation $_{(UMTS\ Band\ II)}$ = 109+ (213.3-50)*10=1742mW=32.41 dBm>24 dBm (max.power)
  Test Position 2 evaluation $_{(UMTS\ Band\ V)}$ = 164+ (213.3-50)*(846.6/150) =1085.66mW=30.36 dBm>24 dBm (max.power)
  Test Position 2 Evaluation $_{(WiFi)}$ = $[10^{(14.5/10)}/5] * (2.462^{1/2})$ =8.84 >3.0
  Test Position 2 Evaluation $_{(BT)}$ = $[10^{(1/10)}/5] * (2.480^{1/2})$ =0.40 <3.0

- Test Position 3: The right edge of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 15).
  SAR is required for GSM/WCDMA antenna in this position.
  SAR is not required for BT/WIFI antenna in this position.
  Test Position 3 Evaluation $_{(GSM\ 850)}$ = $[10^{((29-4.26)/10)}/5] * (0.8488^{1/2})$ =54.88 >3.0
  Test Position 3 Evaluation $_{(GSM\ 1900)}$ = $[10^{((29-6.02)/10)}/5] * (1.9098^{1/2})$ =54 >3.0
  Test Position 3 Evaluation $_{(UMTS\ Band\ II)}$ = $[10^{(24/10)}/5] * (1.9076^{1/2})$ =69.4 >3.0
  Test Position 3 Evaluation $_{(UMTS\ Band\ V)}$ = $[10^{(24/10)}/5] * (0.8466^{1/2})$ =46.2 >3.0
  Test Position 3 Evaluation $_{(WIFI)}$ =96+ (213.3-50)*10=1729mW=32.38 dBm>14.5 dBm (max.power)
  Test Position 3 Evaluation $_{(BT)}$ = 96+ (213.3-50)*10=1729mW=32.38 dBm >1 dBm (max.power)

- Test Position 4: The top edge of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 16).
  SAR is required for GSM 850 antenna in this position.
  SAR is not required for GSM1900/WCDMA/BT/WIFI antenna in this position.
  Test Position 4 evaluation $_{(GSM\ 850)}$ = 164+ (70.3-50)*(848.8/150)=278.87mW=24.45 dBm<(29-4.26) dBm =24.74 dBm (max.power)
  Test Position 4 evaluation $_{(GSM\ 1900)}$ = 109+ (70.3-50)*10=312mW=24.94 dBm> (29-6.02) dBm =22.98(max.power)
  Test Position 4 evaluation $_{(UMTS\ Band\ II)}$ = 109+ (70.3-50)*10=312mW=24.94 dBm>24 dBm (max.power)
  Test Position 4 evaluation $_{(UMTS\ Band\ V)}$ = 164+ (70.3-50)*(846.6/150) =278.57mW=24.45 dBm>24 dBm (max.power)
  Test Position 4 Evaluation $_{(WiFi)}$ = $[10^{(14.5/10)}/28.7] * (2.462^{1/2})$ =1.54 <3.0
  Test Position 4 Evaluation $_{(BT)}$ = $[10^{(1/10)}/28.7] * (2.480^{1/2})$ =0.07 <3.0

- Test Position 5: The bottom edge of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 17).
  SAR is required for GSM/WCDMA antenna in this position.
  SAR is not required for BT/WIFI antenna in this position.
  Test Position 5 Evaluation $_{(GSM\ 850)}$ = $[10^{((29-4.26)/10)}/5] * (0.8488^{1/2})$ =54.88 >3.0
  Test Position 5 Evaluation $_{(GSM\ 1900)}$ = $[10^{((29-6.02)/10)}/5] * (1.9098^{1/2})$ =54 >3.0
  Test Position 5 Evaluation $_{(UMTS\ Band\ II)}$ = $[10^{(24/10)}/5] * (1.9076^{1/2})$ =69.39 >3.0
  Test Position 5 Evaluation $_{(UMTS\ Band\ V)}$ = $[10^{(24/10)}/5] * (0.8466^{1/2})$ =46.22 >3.0
  Test Position 5 Evaluation $_{(WIFI)}$ =96+ (72-50)*10=296mW=24.71 dBm>14.5 dBm (max.power)
  Test Position 5 Evaluation $_{(BT)}$ = 96+ (72-50)*10=296mW=24.71 dBm >1 dBm (max.power)

7. Test Results

7.1. Conducted Power Results

Table 13: Conducted Power Measurement Results

GSM 850		Burst Conducted Power(dBm)			/	Average power(dBm)		
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
GSM		32.61	32.67	32.74	-9.03dB	23.58	23.64	23.71
GPRS (GMSK)	1Txslot	32.59	32.66	32.72	-9.03dB	23.56	23.63	23.69
	2Txslots	29.44	29.75	30.04	-6.02dB	23.42	23.73	24.02
	3Txslots	28.27	28.32	28.44	-4.26dB	**24.01**	**24.06**	**24.18**
	4Txslots	26.5	26.36	26.43	-3.01dB	23.49	23.35	23.42
EGPRS (GMSK)	1Txslot	32.59	32.66	32.72	-9.03dB	23.56	23.63	23.69
	2Txslots	29.44	29.75	30.04	-6.02dB	23.42	23.73	24.02
	3Txslots	28.27	28.32	28.44	-4.26dB	**24.01**	**24.06**	**24.18**
	4Txslots	26.50	26.36	26.43	-3.01dB	23.49	23.35	23.42
EGPRS (8PSK)	1Txslot	26.27	26.71	27.15	-9.03dB	17.24	17.68	18.12
	2Txslots	24.26	24.4	24.42	-6.02dB	18.24	18.38	18.4
	3Txslots	22.54	22.69	22.66	-4.26dB	18.28	18.43	18.4
	4Txslots	20.61	20.37	20.34	-3.01dB	17.6	17.36	17.33
GSM 1900		**Burst Conducted Power(dBm)**			**/**	**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		30.25	30.46	30.48	-9.03dB	21.22	21.43	21.45
GPRS (GMSK)	1Txslot	30.24	30.46	30.47	-9.03dB	21.21	21.43	21.44
	2Txslots	28.78	28.84	28.27	-6.02dB	**22.76**	**22.82**	**22.25**
	3Txslots	26.88	26.75	26.51	-4.26dB	22.62	22.49	22.25
	4Txslots	25.27	25.22	24.69	-3.01dB	22.26	22.21	21.68
EGPRS (GMSK)	1Txslot	30.24	30.46	30.47	-9.03dB	21.21	21.43	21.44
	2Txslots	28.78	28.84	28.27	-6.02dB	**22.76**	**22.82**	**22.25**
	3Txslots	26.88	26.75	26.51	-4.26dB	22.62	22.49	22.25
	4Txslots	25.27	25.22	24.69	-3.01dB	22.26	22.21	21.68
EGPRS (8PSK)	1Txslot	27.12	26.82	26.46	-9.03dB	18.09	17.79	17.43
	2Txslots	25.4	24.91	24.64	-6.02dB	19.38	18.89	18.62
	3Txslots	23.19	22.78	22.24	-4.26dB	18.93	18.52	17.98
	4Txslots	20.82	20.42	19.92	-3.01dB	17.81	17.41	16.91

Note:
1) Division Factors
To average the power, the division factor is as follows:
1Txslot = 1 transmit time slot out of 8 time slots
=> conducted power divided by (8/1) => -9.03 dB
2Txslots = 2 transmit time slots out of 8 time slots
=> conducted power divided by (8/2) => -6.02 dB
3Txslots = 3 transmit time slots out of 8 time slots
=> conducted power divided by (8/3) => -4.26 dB
4Txslots = 4 transmit time slots out of 8 time slots
=> conducted power divided by (8/4) => -3.01 dB
2) Average power numbers
The maximum power numbers are marks in bold.

UMTS Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps RMC	23.36	23.95	22.86
	64kbps RMC	23.34	23.91	22.84
	144kbps RMC	23.36	23.94	22.84
	384kbps RMC	23.34	23.93	22.85
HSDPA	Sub - Test 1	23.36	23.97	22.92
	Sub - Test 2	23.05	23.74	22.67
	Sub - Test 3	22.13	22.89	21.78
	Sub - Test 4	22.11	22.89	21.75
HSUPA	Sub - Test 1	20.63	21.8	20.76
	Sub - Test 2	18.44	19.98	18.86
	Sub - Test 3	21.37	21.92	21.75
	Sub - Test 4	18.92	19.68	18.58
	Sub - Test 5	20.66	21.22	20.75
DC-HSDPA	Sub - Test 1	23.25	23.09	22.92
	Sub - Test 2	22.98	23.56	22.56
	Sub - Test 3	22.05	22.47	21.22
	Sub - Test 4	22.07	22.43	21.23
UMTS Band V		Conducted Power (dBm)		
		Channel 4132	Channel 4183	Channel 4233
RMC	12.2kbps RMC	22.84	22.9	22.67
	64kbps RMC	22.82	22.88	22.66

	144kbps RMC	22.81	22.86	22.66
	384kbps RMC	22.82	22.87	22.64
HSDPA	Sub - Test 1	22.85	22.88	22.68
	Sub - Test 2	22.56	22.63	22.45
	Sub - Test 3	22	22.02	21.86
	Sub - Test 4	21.95	22.02	21.87
HSUPA	Sub - Test 1	20.68	20.28	20.3
	Sub - Test 2	18.44	17.95	18.62
	Sub - Test 3	21.32	20.93	21.08
	Sub - Test 4	18.2	19	18.1
	Sub - Test 5	20.65	20.35	20.37
DC-HSDPA	Sub - Test 1	22.61	22.74	22.53
	Sub - Test 2	22.49	22.51	22.35
	Sub - Test 3	21.59	21.84	21.42
	Sub - Test 4	21.51	21.67	21.43

The average output power of BT antenna is as following:

Channel	**Ch 0 2402 MHz**	**Ch 39 2441 MHz**	**Ch 78 2480 MHz**
BT	-1.1	-0.5	-1.2
Channel	**Ch 0 2402 MHz**	**Ch 19 2440 MHz**	**Ch 39 2480 MHz**
BT4.0	-3.87	-1.31	-2.01

The average output power of WIFI antenna is as following:

WIFI Antenna

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
802.11b	1	1	13.47
		2	13.41
		5.5	13.37
		11	13.24
	6	1	14.18
		2	14.02
		5.5	14.10
		11	13.97
	11	1	13.52
		2	13.44
		5.5	13.41
		11	13.21
802.11g	1	6	12.25
		9	12.11
		12	12.99
		18	11.88
		24	11.67
		36	11.38
		48	11.26
		54	11.04
	6	6	12.68
		9	12.86
		12	12.77
		18	12.59
		24	12.37
		36	12.12
		48	11.87
		54	11.78
	11	6	12.04
		9	11.97
		12	11.79
		18	11.73
		24	11.56
		36	11.18
		48	10.97
		54	10.77
802.11n HT20	1	MCS0	12.05
		MCS1	12.03
		MCS2	11.77
		MCS3	11.65

		MCS4	11.25
		MCS5	10.95
		MCS6	10.96
		MCS7	10.79
	6	MCS0	12.69
		MCS1	12.65
		MCS2	12.52
		MCS3	12.29
		MCS4	11.99
		MCS5	11.72
		MCS6	11.69
		MCS7	11.50
	11	MCS0	11.92
		MCS1	11.77
		MCS2	11.49
		MCS3	11.37
		MCS4	11.15
		MCS5	10.82
		MCS6	10.71
		MCS7	10.58

7.2. SAR Test Results

7.2.1. GSM 850 (GSM/GPRS/EGPRS)

Table 14: SAR Values [GSM 850 (GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	190/836.6	GSM	1:8.3	33.5	32.67	0.040	0.348	1.21	0.421	Figure 12
Left/Tilt	190/836.6	GSM	1:8.3	33.5	32.67	0.080	0.263	1.21	0.318	Figure 13
Right/Cheek	190/836.6	GSM	1:8.3	33.5	32.67	-0.030	0.594	1.21	0.719	Figure 14
Right/Tilt	190/836.6	GSM	1:8.3	33.5	32.67	-0.060	0.51	1.21	0.617	Figure 15
Test Position of Body (Distance 0mm)										
Test Position 1	251/848.8	3Txslots	1:4.14	29	28.44	-0.051	0.927	1.14	1.055	Figure 16
	190/836.6	3Txslots	1:4.14	29	28.32	0.171	1.110	1.17	1.298	Figure 17
	128/824.2	3Txslots	1:4.14	29	28.27	-0.080	1.190	1.18	1.408	Figure18
Test Position 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 3	190/836.6	3Txslots	1:4.14	29	28.32	0.025	0.319	1.17	0.373	Figure19
Test Position 4	190/836.6	3Txslots	1:4.14	29	28.32	0.039	0.038	1.17	0.044	Figure20
Test Position 5	190/836.6	3Txslots	1:4.14	29	28.32	0.110	0.244	1.17	0.285	Figure21
Worst Case Position of Body with EGPRS(Distance 0mm)										
Test Position 1	128/824.2	3Txslots	1:4.14	29	28.27	-0.090	1.160	1.18	1.372	Figure22
Worst Test Position of Body with Earphone (Distance 0mm)										
Test Position 1	128/824.2	GSM	1:8.3	33.5	32.61	-0.032	1.070	1.23	1.313	Figure23
Worst Case Position of Body (1st Repeated SAR, Distance 0mm)										
Test Position 1	128/824.2	3Txslots	1:4.14	29	28.27	0.106	1.170	1.18	1.384	Figure24

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

4. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

Table 15: SAR Measurement Variability Results [GSM 850 (GPRS/EGPRS)]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 1	3Txslots	128/824.2	1.19	1.17	1.02	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.2.2. GSM 1900 (GSM/GPRS/EGPRS)

Table 16: SAR Values [GSM 1900 (GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	661/1880	GSM	1:8.3	31	30.46	0.06	0.076	1.13	0.086	Figure 25
Left/Tilt	661/1880	GSM	1:8.3	31	30.46	0.031	0.066	1.13	0.075	Figure 26
Right/Cheek	661/1880	GSM	1:8.3	31	30.46	0.05	0.314	1.13	0.356	Figure 27
Right/Tilt	661/1880	GSM	1:8.3	31	30.46	-0.1	0.227	1.13	0.257	Figure 28
Test Position of Body (Distance 0mm)										
Test Position 1	810/1909.8	2Txslots	1:4.14	29	28.27	0.036	0.824	1.18	0.975	Figure 29
	661/1880	2Txslots	1:4.14	29	28.84	0.038	0.904	1.04	0.938	Figure 30
	512/1850.2	2Txslots	1:4.14	29	28.78	0.030	0.962	1.05	1.012	Figure 31
Test Position 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 3	661/1880	2Txslots	1:4.14	29	28.84	0.160	0.246	1.04	0.255	Figure 32
Test Position 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 5	661/1880	2Txslots	1:4.14	29	28.84	0.035	0.174	1.04	0.181	Figure 33
Worst Test Position of Body with EGPRS(Distance 0mm)										
Test Position 1	512/1850.2	2Txslots	1:4.14	29	28.78	0.100	0.988	1.05	1.039	Figure 34
Worst Case Position of Body (1st Repeated SAR, Distance 0mm)										
Test Position 1	512/1850.2	2Txslots	1:4.14	29	28.78	0.058	1.03	1.05	1.084	Figure 35

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

4. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

Table 17: SAR Measurement Variability Results [GSM 1900 (GPRS/EGPRS)]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 1	512/1850.2	2Txslots	0.962	1.030	1.07	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.2.3. UMTS Band II (WCDMA/HSDPA/HSUPA)

Table 18: SAR Values [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	9400/1880	RMC 12.2K	1:1	24	23.95	0.031	0.095	1.01	0.096	Figure 36
Left/Tilt	9400/1880	RMC 12.2K	1:1	24	23.95	0.13	0.064	1.01	0.065	Figure 37
Right/Cheek	9400/1880	RMC 12.2K	1:1	24	23.95	-0.031	0.316	1.01	0.320	Figure 38
Right/Tilt	9400/1880	RMC 12.2K	1:1	24	23.95	0.04	0.237	1.01	0.240	Figure 39
Test Position of Body (Distance 0mm)										
Test Position 1	9538/1909.8	RMC 12.2K	1:1	24	22.86	0.088	0.966	1.30	1.256	Figure 40
	9400/1880	RMC 12.2K	1:1	24	23.95	0.099	0.984	1.01	0.995	Figure 41
	9262/1880	RMC 12.2K	1:1	24	23.36	0.024	0.970	1.16	1.124	Figure 42
Test Position 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 3	9400/1880	RMC 12.2K	1:1	24	23.95	-0.040	0.267	1.01	0.270	Figure 43
Test Position 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 5	9400/1880	RMC 12.2K	1:1	24	23.95	0.020	0.190	1.01	0.192	Figure 44
Worst Test Position of Body with Earphone (Distance 0mm)										
Test Position 1	9538/1909.8	RMC 12.2K	1:1	24	22.86	0.090	1.040	1.30	1.352	Figure 45
Worst Case Position of Body (1st Repeated SAR, Distance 0mm)										
Test Position 1	9400/1880	RMC 12.2K	1:1	24	23.95	0.051	1.050	1.01	1.062	Figure 46

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. WCDMA mode was tested under RMC 12.2kbps with HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level or the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.
4. WCDMA mode was tested under RMC 12.2kbps with DC-HSDPA inactive per KDB Publication 941225 D02. DC-HSDPA SAR for body was not required since the average output power of the DC-HSDPA subtests was not more than 0.25 dB higher than the RMC level.

Table 19: SAR Measurement Variability Results [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 1	9400/1880	RMC 12.2K	0.984	1.05	1.07	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.2.4. UMTS Band V (WCDMA/HSDPA/HSUPA)

Table 20: SAR Values [UMTS Band V (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	4183/836.6	RMC 12.2K	1:1	24	22.9	-0.02	0.174	1.29	0.224	Figure 47
Left/Tilt	4183/836.6	RMC 12.2K	1:1	24	22.9	0.028	0.160	1.29	0.206	Figure 48
Right/Cheek	4183/836.6	RMC 12.2K	1:1	24	22.9	0.02	0.503	1.29	0.648	Figure 49
Right/Tilt	4183/836.6	RMC 12.2K	1:1	24	22.9	-0.093	0.482	1.29	0.621	Figure 50
Test Position of Body (Distance 0mm)										
Test Position 1	4233/846.6	RMC 12.2K	1:1	24	22.67	-0.079	1.070	1.36	1.453	Figure 51
	4183/836.6	RMC 12.2K	1:1	24	22.9	0.031	1.150	1.29	1.481	Figure 52
	4132/826.4	RMC 12.2K	1:1	24	22.84	0.035	0.940	1.31	1.228	Figure 53
Test Position 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 3	4183/836.6	RMC 12.2K	1:1	24	22.9	-0.05	0.313	1.29	0.403	Figure 54
Test Position 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 5	4183/836.6	RMC 12.2K	1:1	24	22.9	0.07	0.264	1.29	0.340	Figure 55
Worst Test Position of Body with Earphone (Distance 0mm)										
Test Position 1	4183/836.6	RMC 12.2K	1:1	24	22.84	0.195	1.050	1.31	1.371	Figure 56
Worst Case Position of Body (1st Repeated SAR, Distance 0mm)										
Test Position 1	4183/836.6	RMC 12.2K	1:1	24	22.84	-0.02	1.060	1.31	1.385	Figure 57

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. WCDMA mode was tested under RMC 12.2kbps with HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level or the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.

4. WCDMA mode was tested under RMC 12.2kbps with DC-HSDPA inactive per KDB Publication 941225 D02. DC-HSDPA SAR for body was not required since the average output power of the DC-HSDPA subtests was not more than 0.25 dB higher than the RMC level.

Table 21: SAR Measurement Variability Results [UMTS Band V (WCDMA/HSDPA/HSUPA)]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 1	RMC 12.2K	4183/836.6	1.15	1.06	1.08	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.2.5. WIFI (802.11b, WIFI)

Table 22: SAR Values (802.11b)

Test Position	Channel/ Frequency (MHz)	Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit of SAR 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	6/2437	DSSS	1:1	14.5	14.18	-0.036	0.00274	1.08	0.003	Figure 58
Left/Tilt	6/2437	DSSS	1:1	14.5	14.18	0.150	0.00360	1.08	0.004	Figure 59
Right/Cheek	6/2437	DSSS	1:1	14.5	14.18	0.048	0.00583	1.08	0.006	Figure 60
Right/Tilt	6/2437	DSSS	1:1	14.5	14.18	0.023	0.00249	1.08	0.003	Figure 61
Test Position of Body (0mm)										
Test Position 1	11/2462	DSSS	1:1	14.5	13.52	0.003	0.644	1.25	0.807	Figure 62
	6/2437	DSSS	1:1	14.5	14.18	0.062	0.763	1.08	0.821	Figure 63
	1/2412	DSSS	1:1	14.5	13.47	0.091	0.924	1.27	1.171	Figure 64
Test Position 2	6/2437	DSSS	1:1	14.5	14.18	0.029	0.434	1.08	0.467	Figure 65
Test Position 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 4	6/2437	DSSS	1:1	14.5	14.18	0.022	0.057	1.08	0.062	Figure 66
Test Position 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Worst Case Position of Body (1st Repeated SAR, Distance 0mm)										
Test Position 1	1/2412	DSSS	1:1	14.5	13.47	0.082	0.939	1.27	1.190	Figure 67

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 23: SAR Measurement Variability Results [802.11b]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 1	1/2412	DSSS	0.924	0.939	1.02	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

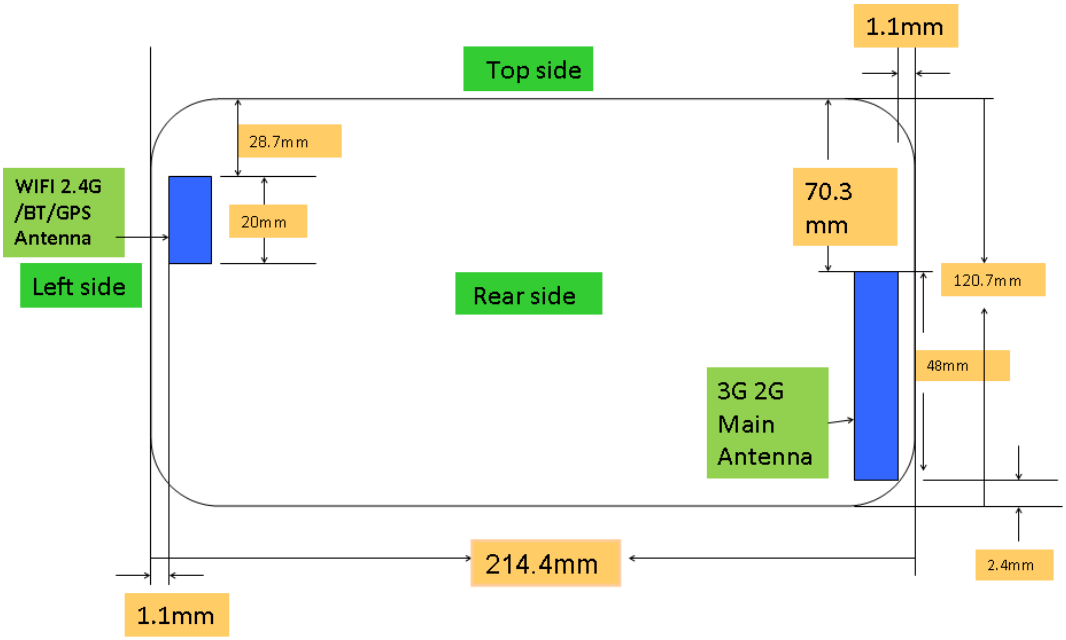
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.3. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	SimultaneousTransmissions	Voice Over Digital Transport (Data)
GSM	850	VO	Yes WIFI or BT	NA
	1900	VO	Yes WIFI or BT	NA
	GPRS /EGPRS	DT	Yes WIFI or BT	NA
WCDMA	UMTS Band Ⅱ	VO	Yes WIFI or BT	NA
	UMTS Band Ⅴ	VO	Yes WIFI or BT	NA
	HSDPA/HSUPA/RMC/HSPA+/DC-HSDPA	DT	Yes WIFI or BT	NA
WIFI	2450	DT	Yes GSM,GPRS,EGPRS, WCDMA/HSDPA/HSUPA/RMC/HSPA+/DC-HSDPA	Yes
Bluetooth (BT)	2400	DT	Yes GSM,GPRS,EGPRS, WCDMA/HSDPA/HSUPA/RMC/HSPA+/DC-HSDPA	NA
Note: VO Voice Service only DT Digital Transport				

The location of the antennas inside EUT is shown in ANNEX I:



Estimated SAR

(1) for test separation distances ≤ 50 mm

When standalone SAR is not required to be measured per FCC KDB 447498 D01, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter for test separation distances ≤ 50 mm.

$$\textbf{Estimated SAR} = \frac{\textbf{(max. power of channel, including tune-up tolerance, mW)}}{\textbf{(min. test separation distance, mm)}} \square \frac{\sqrt{\textbf{f (GHz)}}}{\textbf{7.5}}$$

(2) for test separation distances >50 mm

0.4 W/kg for 1-g SAR

Head Estimated $SAR_{Max.BT.\ Test\ Position\ 1}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Head Estimated $SAR_{Max.BT.\ Test\ Position\ 2}$= $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Head Estimated $SAR_{Max.BT.\ Test\ Position\ 3}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Head Estimated $SAR_{Max.BT.\ Test\ Position\ 4}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Head Estimated $SAR_{Max.BT.\ Test\ Position\ 5}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg

Body Estimated $SAR_{Max.BT.\ Test\ Position\ 1}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Body Estimated $SAR_{Max.BT.\ Test\ Position\ 2}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Body Estimated $SAR_{Max.\ BT.\ Test\ Position\ 3}$ ≤ 0.4W/kg
Body Estimated $SAR_{Max.BT.\ Test\ Position\ 4}$ = $[10^{(1/10)}/5]*(2.48^{0.5}/7.5)$ =0.053kg
Body Estimated $SAR_{Max.\ BT.\ Test\ Position\ 5}$ ≤ 0.4W/kg

Per FCC KDB 447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\textbf{Ratio} = \frac{(\textbf{SAR}_1 + \textbf{SAR}_2)^{1.5}}{\textbf{(min. test separation distance, mm)}} < \textbf{0.04}$$

GSM/UMTS&WIFI Mode

Reported SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	WIFI	MAX. Σ SAR_{1g}	peak location separation ratio
Left hand, Touch cheek	**0.421**	0.086	0.096	0.224	**0.003**	0.424	No
Left hand, Tilt 15 Degree	**0.318**	0.075	0.065	0.206	**0.004**	0.322	No
Right hand, Touch cheek	**0.719**	0.356	0.320	0.648	**0.006**	0.725	No
Right hand, Tilt 15 Degree	0.617	0.257	0.240	**0.621**	**0.003**	0.624	No
Test Position 1	1.408	1.084	1.352	**1.481**	**1.190**	2.671	Yes
Test Position 2	0.4	0.4	0.4	0.4	**0.467**	0.867	No
Test Position 3	0.373	0.255	0.270	**0.403**	**0.4**	0.803	No
Test Position 4	0.044	0.4	0.4	**0.4**	**0.062**	0.462	No
Test Position 5	0.285	0.181	0.192	**0.340**	**0.4**	0.740	No

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.
2. MAX. ΣSAR_{1g} = Reported $SAR_{Max.WIFI}$ + Reported $SAR_{Max.GSM/UMTS}$

MAX. ΣSAR_{1g} = 2.671W/kg ＞1.6 W/kg, so the SAR to peak location separation ratio should be considered

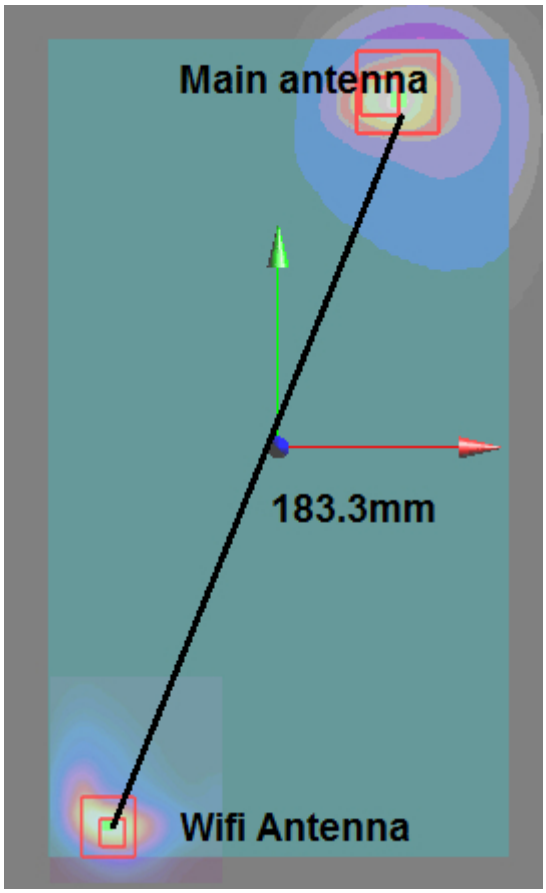
Reported SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	WIFI	MAX. Σ SAR_{1g}
Test Position 1	1.408	/	/	/	1.190	2.598
	/	1.084	/	/	1.190	2.274
	/	/	1.352	/	1.190	2.542
	/	/	/	1.481	1.190	2.671

Note: 1.The value with red color is the SAR_{1g} >1.6 W/kg.
2. when the MAX. Σ SAR_{1g} potio>1.6 W/kg in a position, simultaneous transmission conditions of other bands also need consideration in this position.

Pair Simultaneous Transmission for GSM 850 Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	GSM 850	WIFI	MAX. Σ SAR_{1g}
Test position 1	1.408	1.190	2.598

The position $SAR_{GSM\ 850}$ is (x_1= 37.5, y_1= 84, z_1= -179.9),
The position $SAR_{Max.WIFI}$ is (x_2= -28.5, y_2=-87,z_2= -179.9)
so the distance between the $SAR_{Max.GSM\ 850}$ and $SAR_{Max.WIFI}$ is183.3mm.

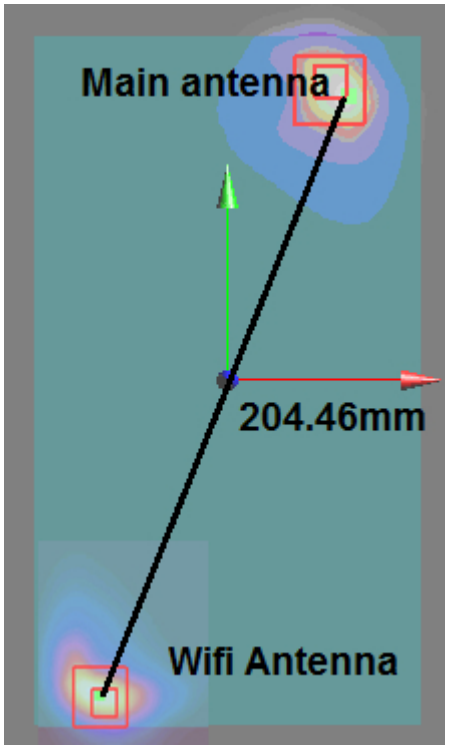


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.408W/kg +(Reported $SAR_{Max.WIFI}$) 1.190W/kg]$^{3/2}$ /Peak SAR Location Separation =2.598$^{3/2}$ /183.3≈0.02 <0.04
So Simultaneous SAR testing for GSM 850 and Wifi is not required

Pair Simultaneous Transmission for GSM 1900 Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	GSM 1900	WIFI	MAX. Σ SAR_{1g}
Test position 1	1.084	1.190	2.274

The position $SAR_{GSM\ 1900}$ is (x_1=49.5, y_1= 102, z_1= -179.9),
The position $SAR_{Max.WIFI}$ is (x_2= -28.5, y_2=-87,z_2= -179.9)
so the distance between the $SAR_{MaxGSM\ 1900}$ and $SAR_{Max.WIFI}$ is 204.46mm.

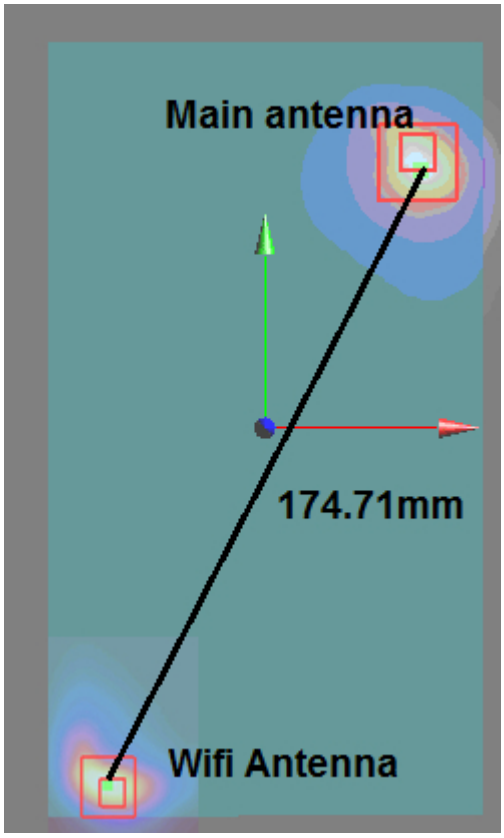


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.084W/kg +(Reported $SAR_{Max.WIFI}$) 1.190W/kg]$^{3/2}$ /Peak SAR Location Separation =2.274$^{3/2}$ /204.46≈0.02 <0.04
So Simultaneous SAR testing for GSM 1900 and Wifi is not required

Pair Simultaneous Transmission for UMTS Band II Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	UMTS Band II	WIFI	MAX. Σ SAR_{1g}
Test position 1	1.352	1.190	2.542

The position $SAR_{UMTS\ Band\ II}$ is (x_1=40.5, y_1=73.5, z_1= -179.9),
The position $SAR_{Max.WIFI}$ is (x_2= -28.5, y_2=-87,z_2= -179.9)
so the distance between the $SAR_{Max.UMTS\ II}$ and $SAR_{Max.WIFI}$ is174.71mm.

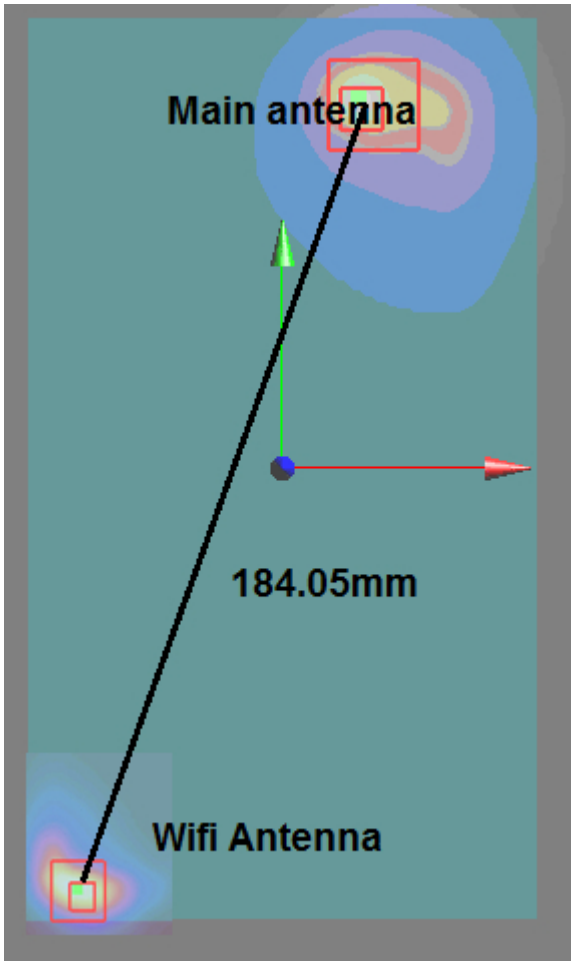


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.352W/kg +(Reported $SAR_{Max.WIFI}$) 1.190W/kg]$^{3/2}$ /Peak SAR Location Separation =2.542$^{3/2}$ /174.71≈0.02 <0.04
So Simultaneous SAR testing for UMTS Band II and Wifi is not required

Pair Simultaneous Transmission for UMTS Band V and Wifi

Reported SAR_{1g}(W/kg) / Test Position	UMTS Band V	WIFI	MAX. Σ SAR_{1g}
Test position 1	1.481	1.190	2.671

The position $SAR_{UMTS\ Band\ V}$ is (x_1=30, y_1=87.5, z_1= -179.9),
The position $SAR_{Max.WIFI}$ is (x_2= -28.5, y_2=-87,z_2= -179.9)
so the distance between the $SAR_{Max.UMTS\ V}$ and $SAR_{Max.WIFI}$ is 184.05mm.



Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.481W/kg +(Reported $SAR_{Max.WIFI}$) 1.190W/kg]$^{3/2}$ /Peak SAR Location Separation =2.671$^{3/2}$ /184.05 ≈0.02 <0.04
So Simultaneous SAR testing for UMTS Band V and Wifi is not required

GSM/UMTS&BT Mode

Reported SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	BT	MAX. Σ SAR_{1g}	peak location separation ratio
Left hand, Touch cheek	**0.421**	0.086	0.096	0.224	**0.053**	0.474	No
Left hand, Tilt 15 Degree	**0.318**	0.075	0.065	0.206	**0.053**	0.371	No
Right hand, Touch cheek	**0.719**	0.356	0.320	0.648	**0.053**	0.772	No
Right hand, Tilt 15 Degree	0.617	0.257	0.240	**0.621**	**0.053**	0.674	No
Test Position 1	1.408	1.084	1.352	**1.481**	**0.053**	1.534	No
Test Position 2	0.4	0.4	0.4	0.4	**0.053**	0.453	No
Test Position 3	0.373	0.255	0.270	**0.403**	0.4	0.803	No
Test Position 4	0.044	0.4	0.4	**0.4**	**0.053**	0.453	No
Test Position 5	0.285	0.181	0.192	**0.340**	0.4	0.740	No

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.
2. MAX. ΣSAR_{1g} = Reported $SAR_{Max.WIFI}$ + Reported $SAR_{Max.GSM/UMTS}$

MAX. ΣSAR_{1g} = 1.534W/kg <1.6 W/kg, So the Simultaneous SAR testing are not required for BT and GSM/UMTS antenna.

WIFI antenna and BT antenna cannot transmit simultaneously.

8. 700MHz to 3GHz Measurement Uncertainty

The measured SAR were <1.5 W/kg for all frequency bands, therefore per KDB Publication 865664 D01v01r03, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2003 is not required in SAR reports

9. Main Test Instruments

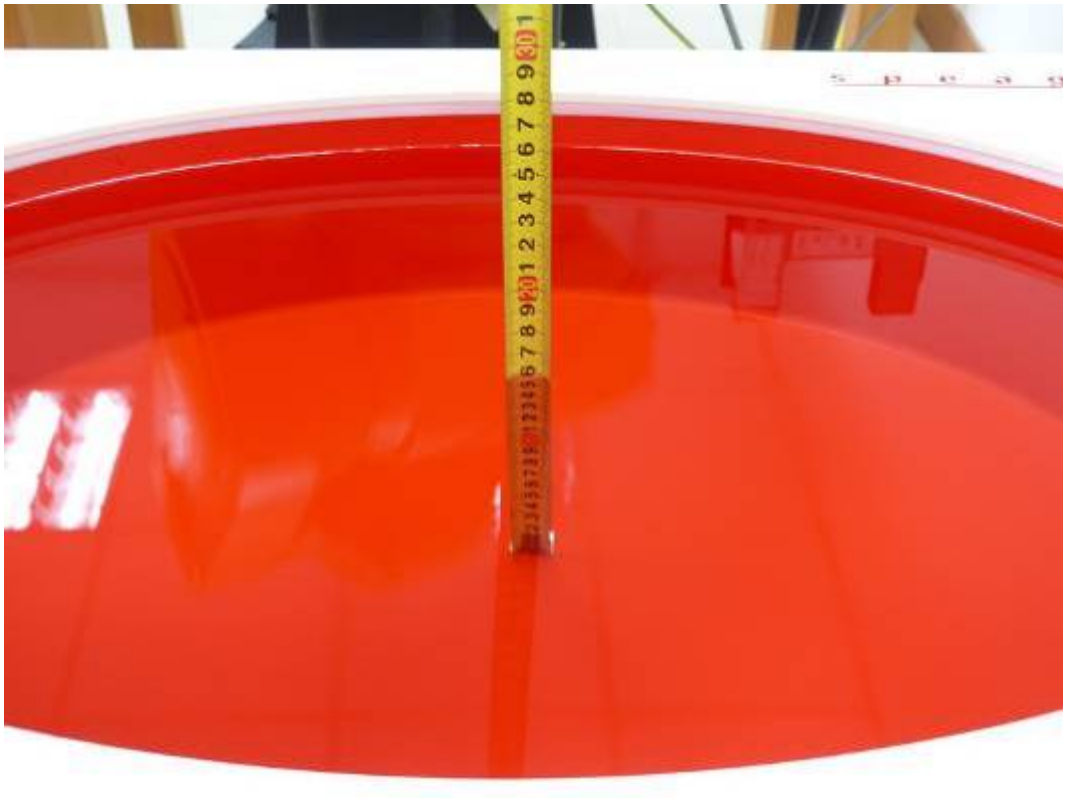
Table 24: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 10, 2013	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 8, 2014	One year
04	Power sensor	Agilent N8481H	MY50350004	September 23, 2013	One year
05	Power sensor	E9327A	US40441622	January 1, 2014	One year
06	Signal Generator	HP 8341B	2730A00804	September 9, 2013	One year
07	Dual directional coupler	778D-012	50519	March 25, 2013	One year
08	Dual directional coupler	777D	50146	March 25, 2013	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	BTS	E5515C	MY48360988	November 26, 2013	One year
11	E-field Probe	EX3DV4	3677	November 28, 2013	One year
12	DAE	DAE4	1317	January 16, 2014	One year
13	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
14	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
15	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
16	Temperature Probe	JM222	AA1009129	March 8, 2014	One year
17	Hygrothermograph	WS-1	64591	September 26, 2013	One year

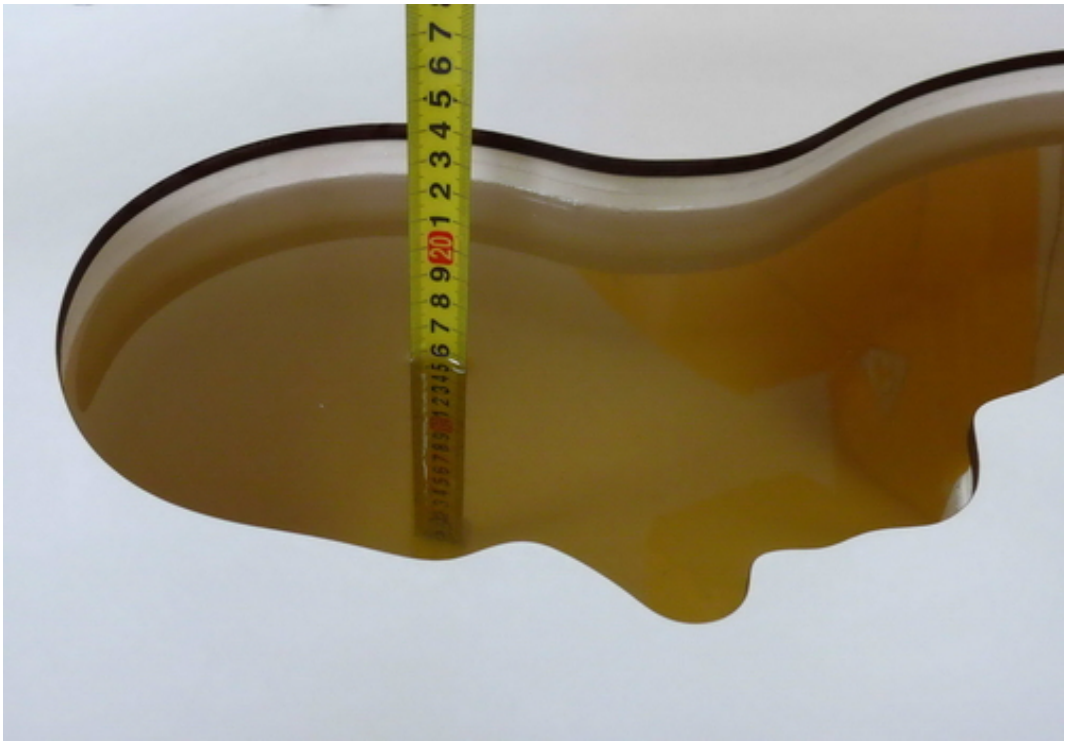
*****END OF REPORT *****

ANNEX A: Test Layout

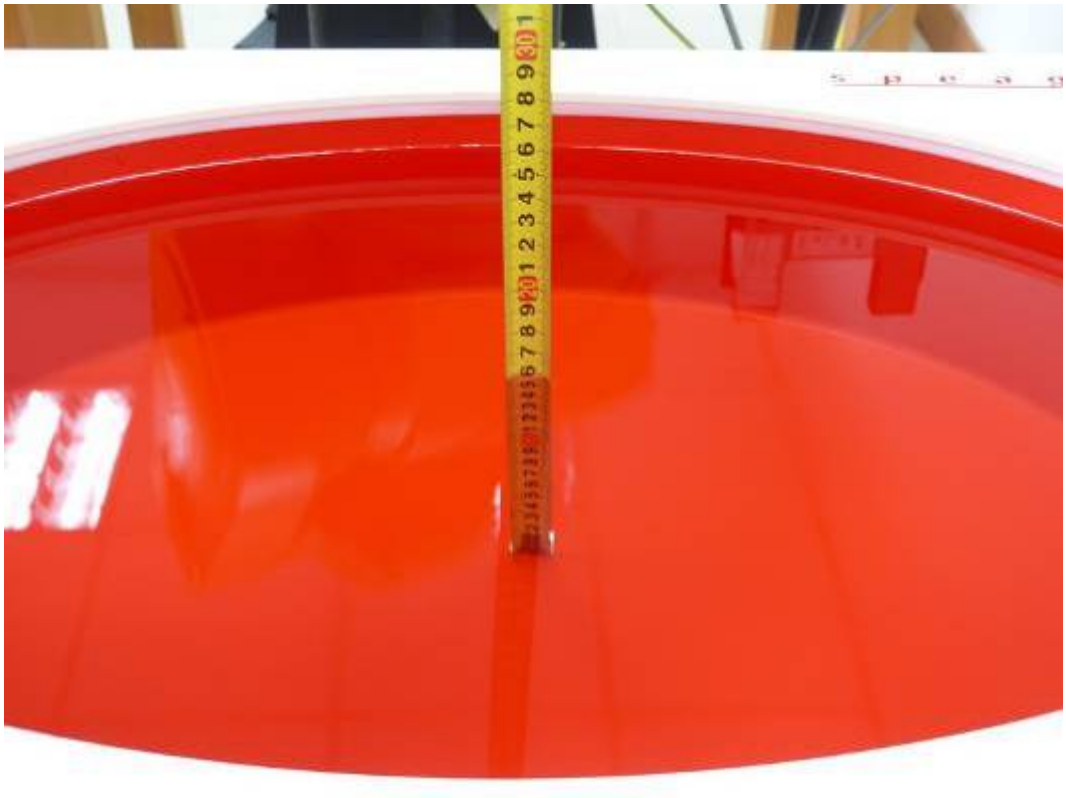
Picture 1: Specific Absorption Rate Test Layout



Picture 2: Liquid depth in the Flat Phantom (835 MHz, 15.4cm depth)

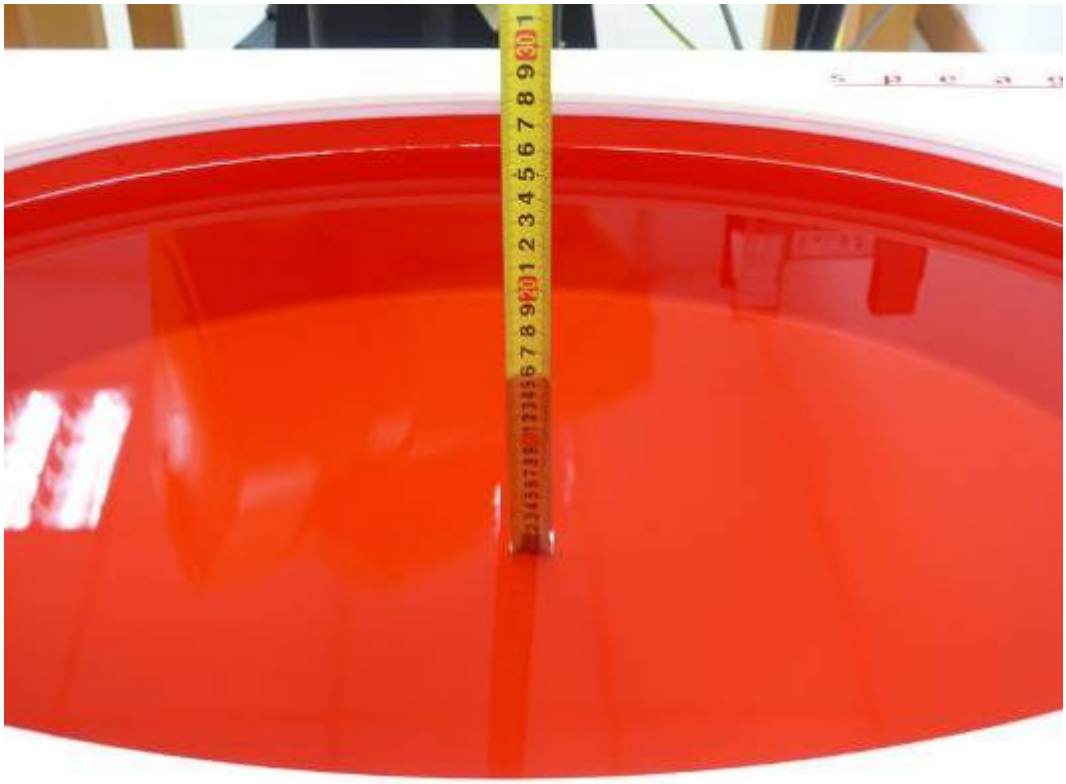


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



Picture 4: Liquid depth in the Flat Phantom (1900 MHz, 15.1cm depth)

Picture 5: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 6: Liquid depth in the Flat Phantom (2450 MHz, 15.3cm depth)

Picture 7: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date/Time: 3/19/2014 11:40:25 PM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.64 mW/g

d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.64 mW/g

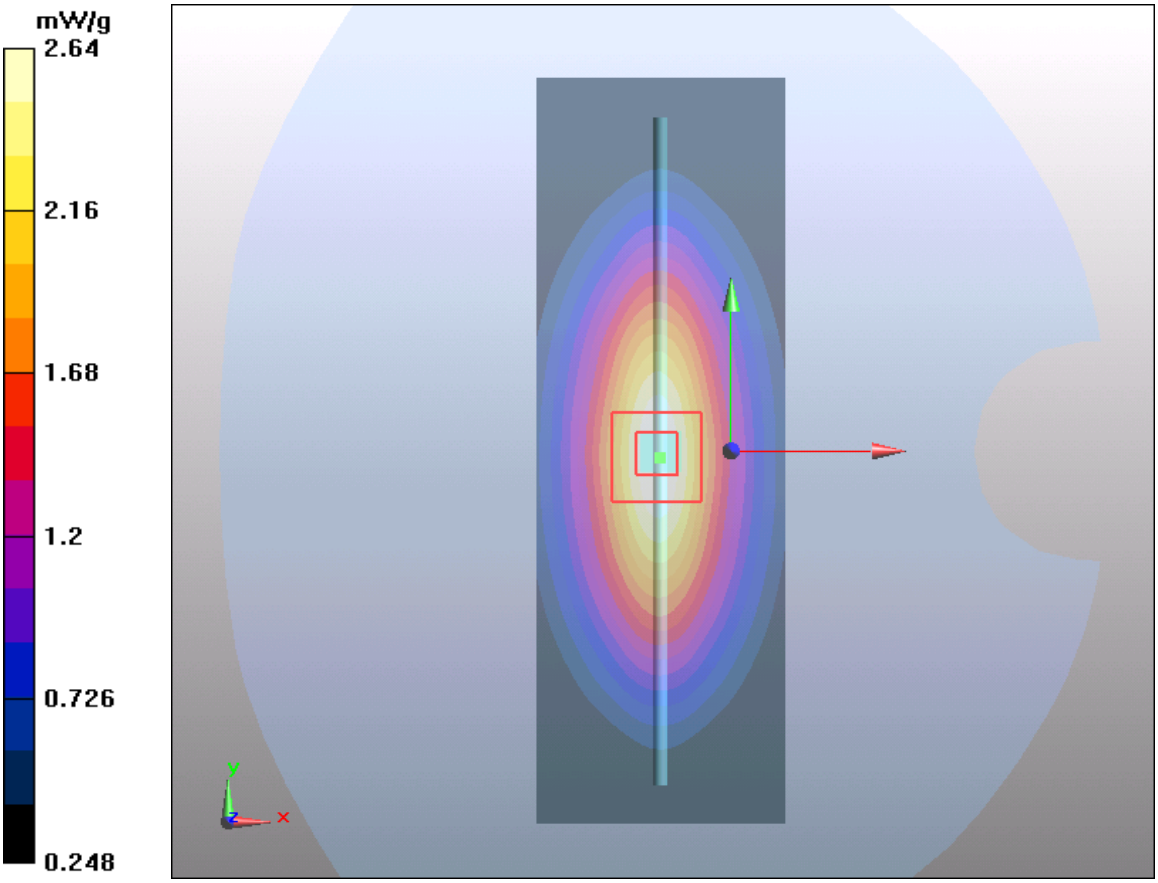


Figure 6 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date/Time: 3/20/2014 1:31:47 PM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 – SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.72 mW/g

d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.9 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 3.63 W/kg

SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.73 mW/g

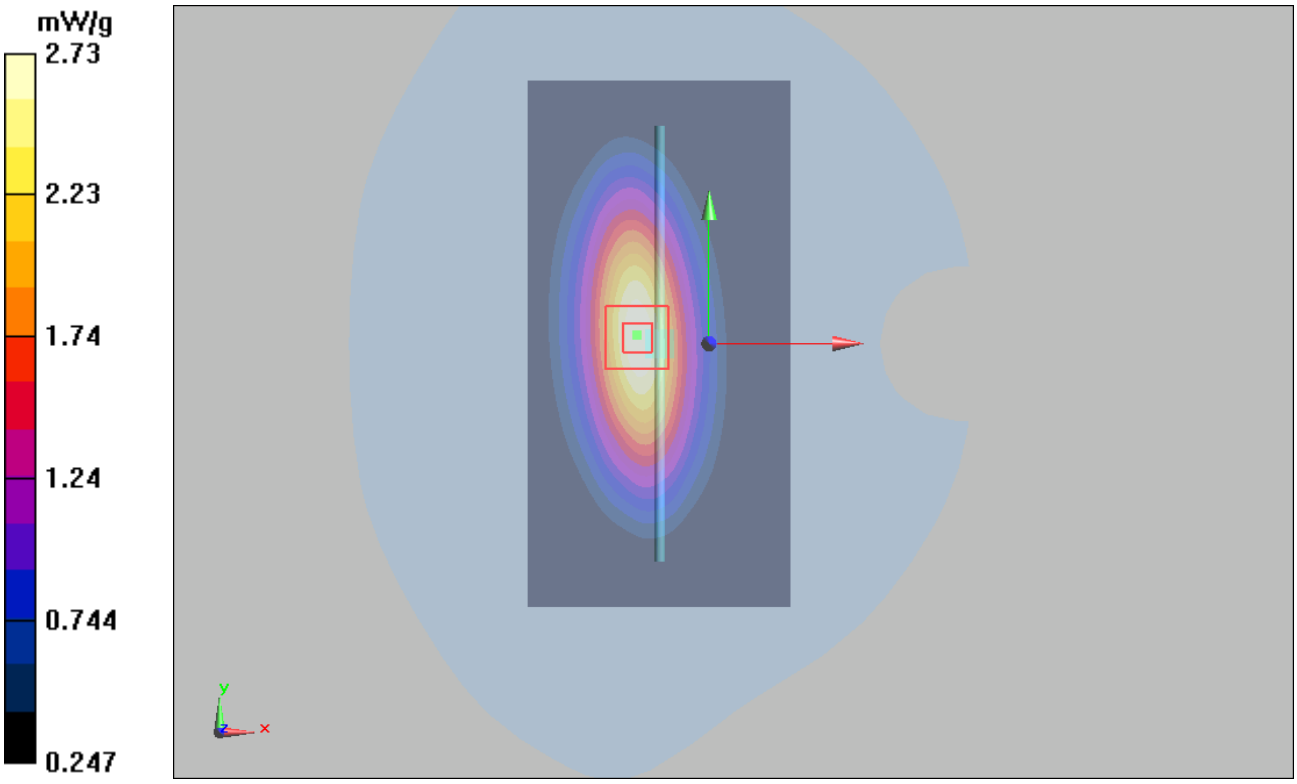


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 3/16/2014 8:53:29 AM

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.7 mW/g

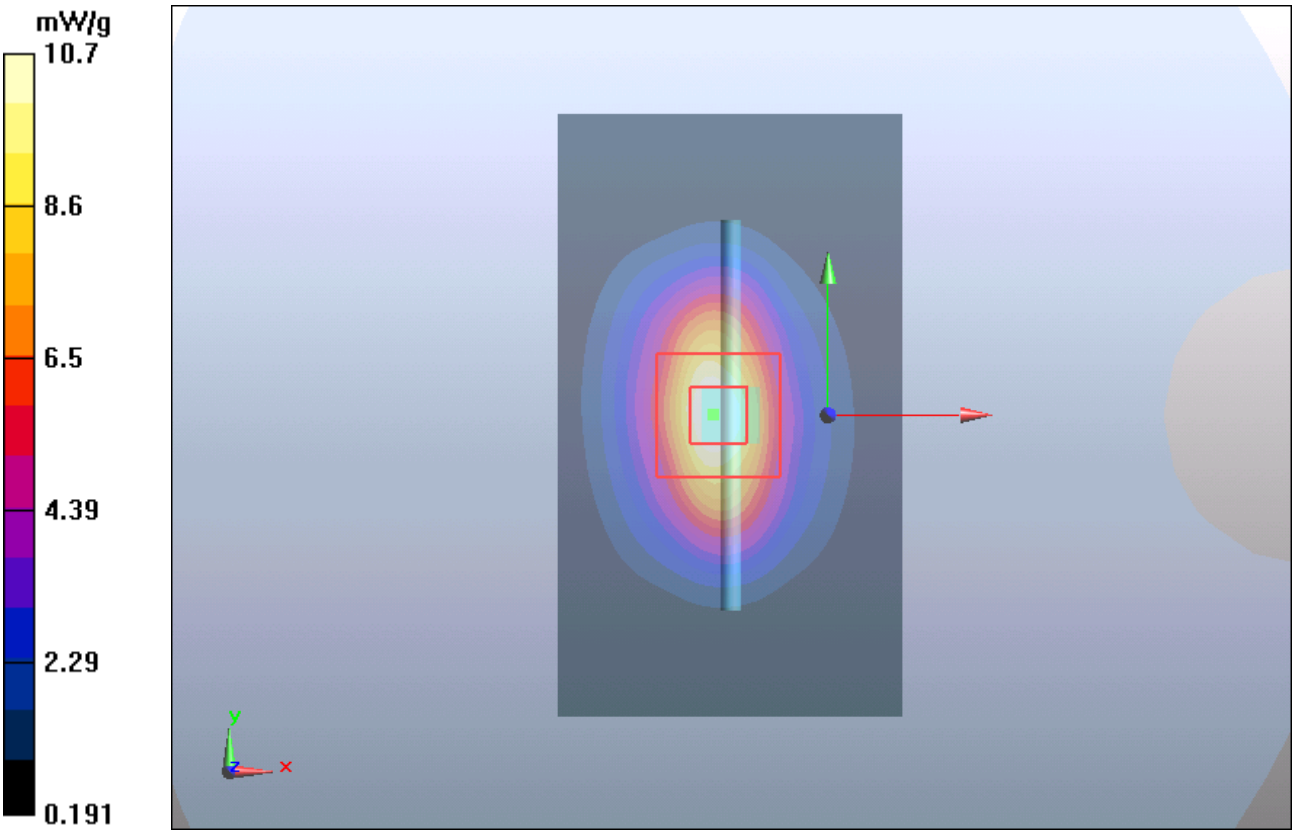


Figure 8 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 3/10/2014 2:05:21 AM

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.8 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 9.82 mW/g; SAR(10 g) = 5.2 mW/g

Maximum value of SAR (measured) = 11 mW/g

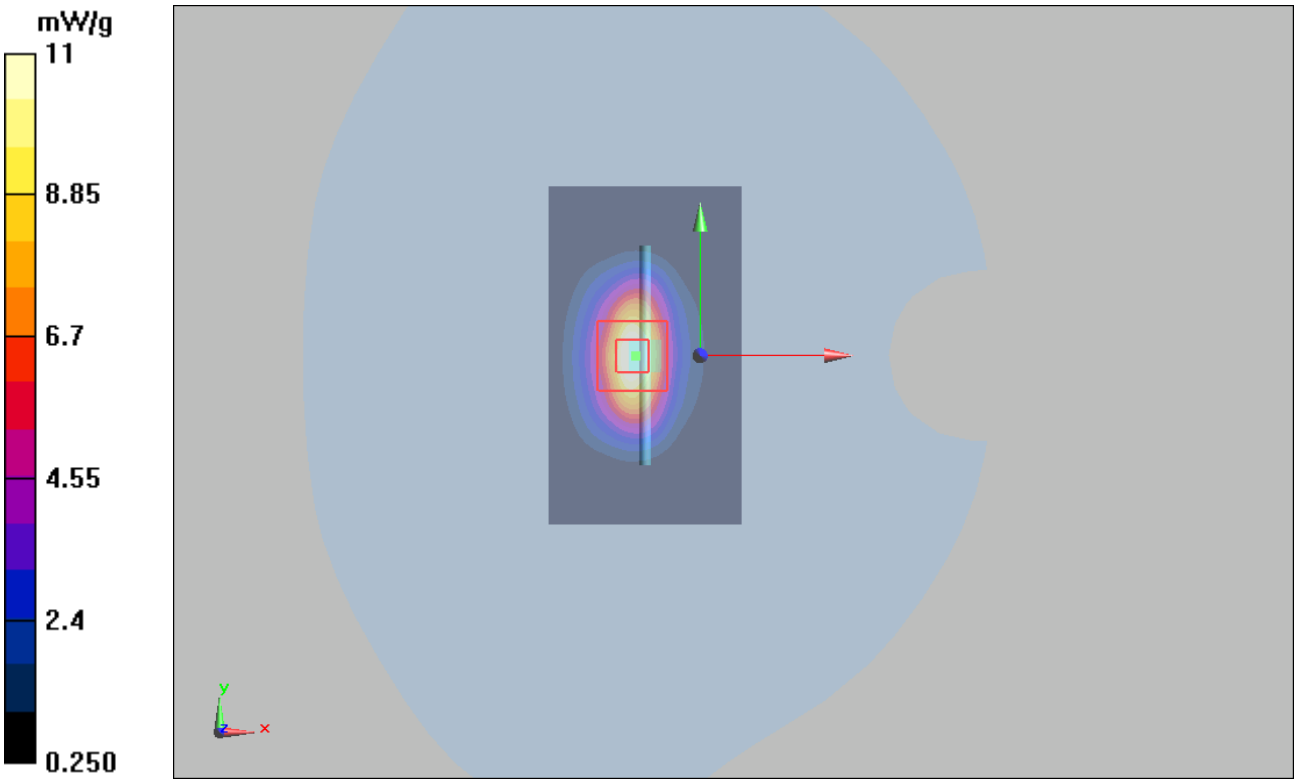


Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date/Time: 3/19/2014 5:41:12 AM

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.80 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 18.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g

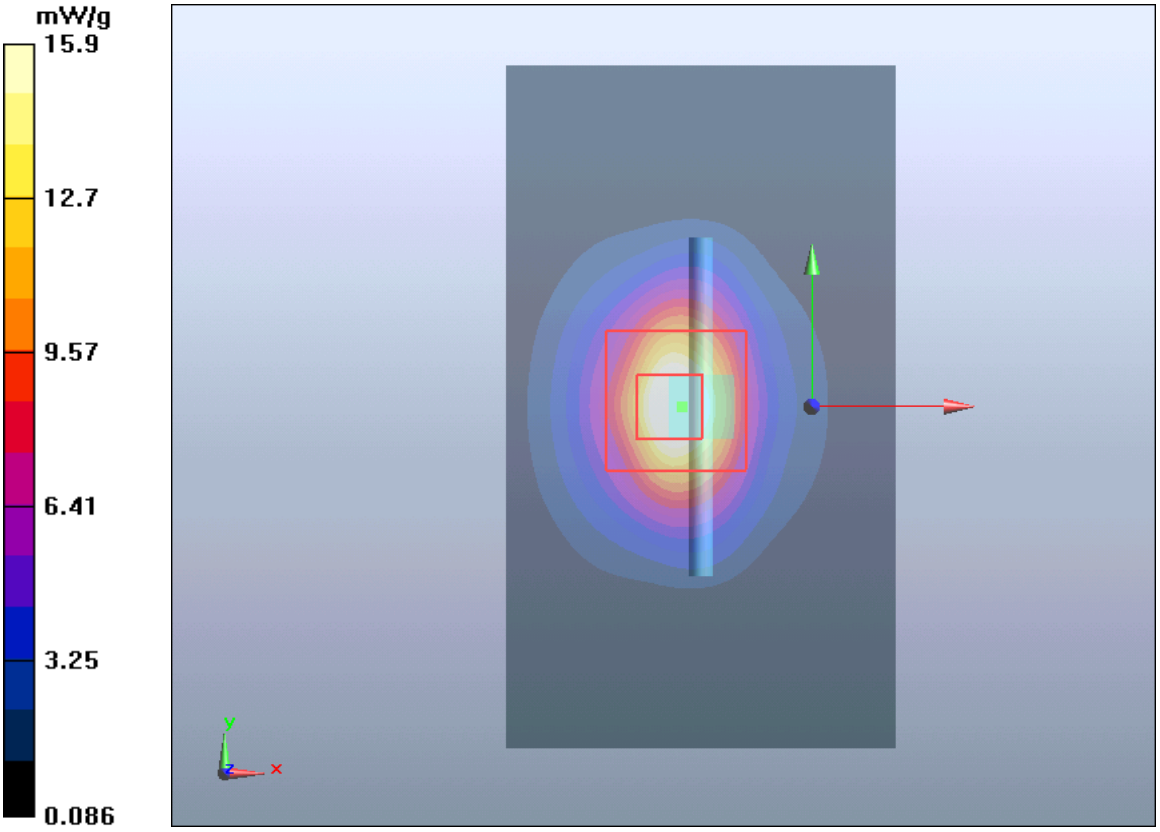


Figure 10 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date/Time: 3/18/2014 22:30:37 PM

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI v4.0; Type: QDOVA001BB;

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 17.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.4 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 26.1 W/kg

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.27 mW/g

Maximum value of SAR (measured) = 15 mW/g

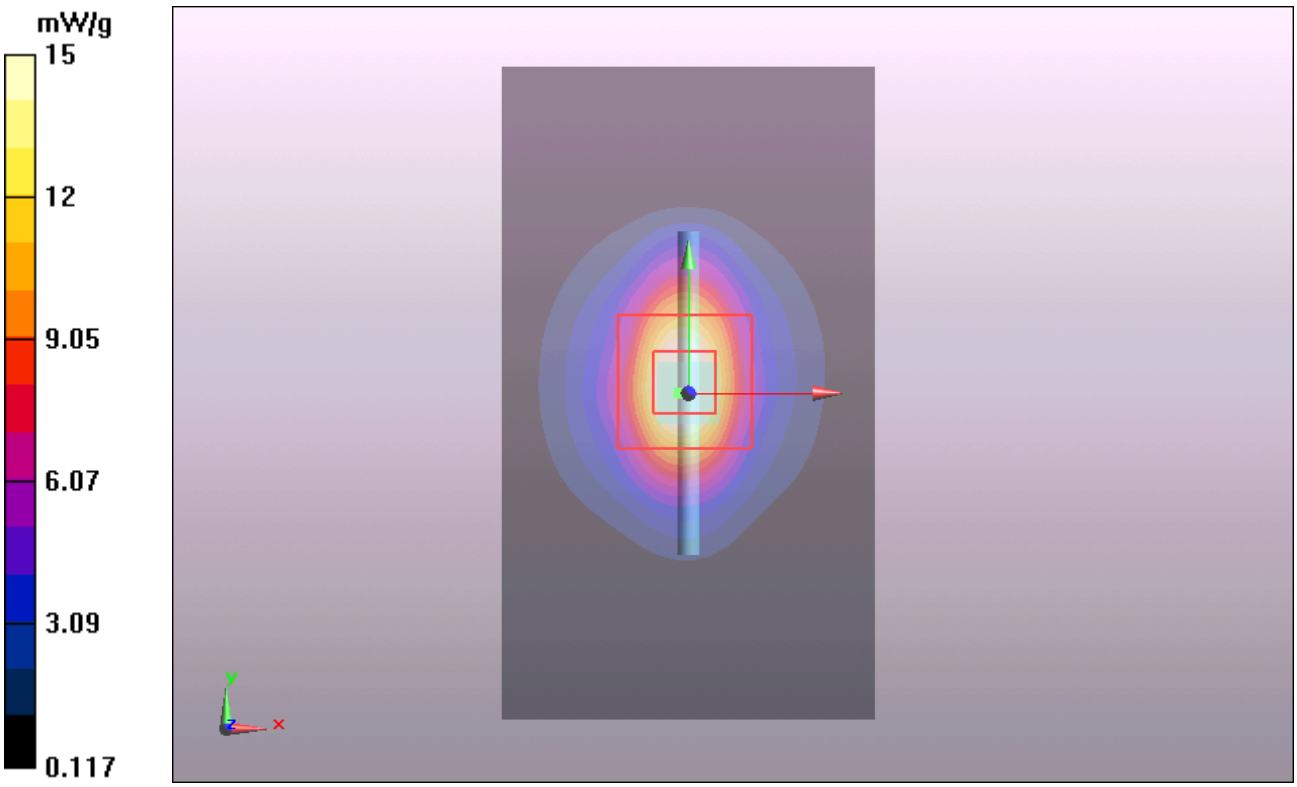


Figure 11 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle

Date/Time: 3/20/2014 2:42:15 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.377 W/kg

Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.615 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.348 W/kg; SAR(10 g) = 0.237 W/kg
Maximum value of SAR (measured) = 0.365 W/kg

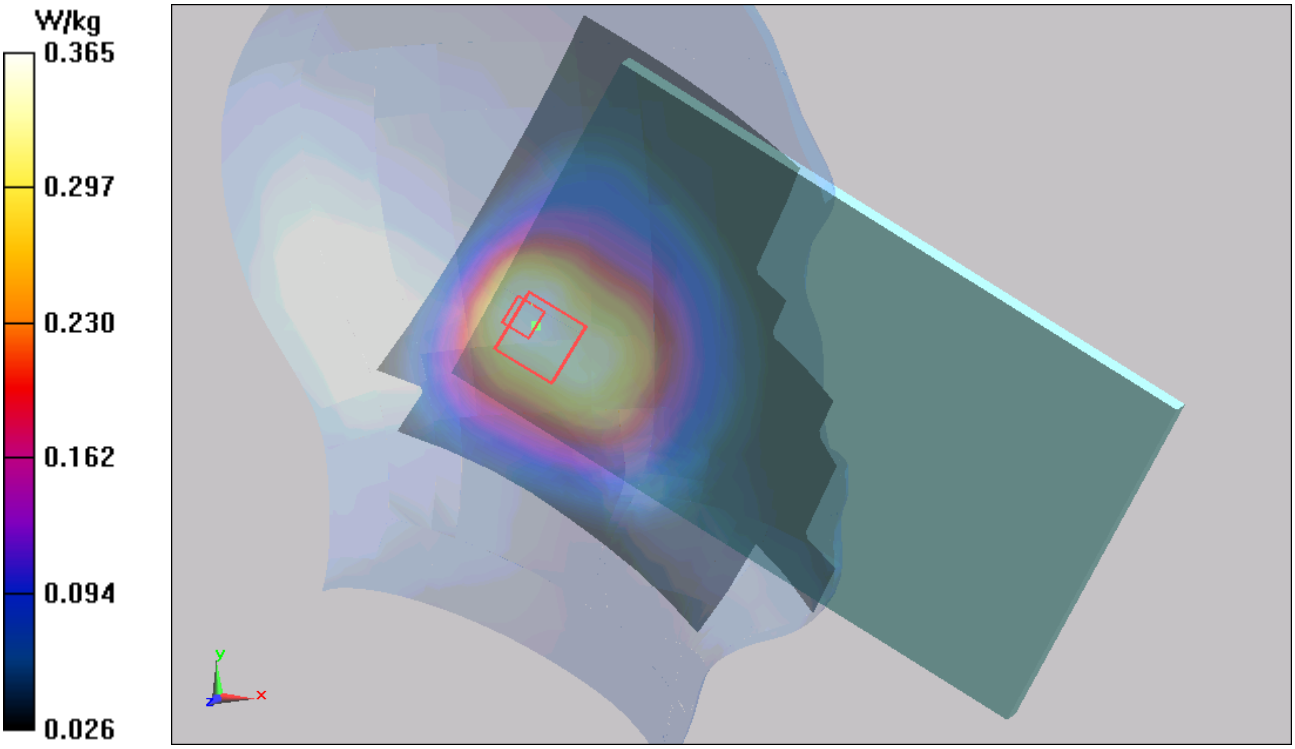


Figure 12 Left Hand Touch Cheek GSM 850 Channel 190

GSM 850 Left Tilt Middle

Date/Time: 3/20/2014 3:03:40 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.283 W/kg

Left Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.310 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.394 W/kg
SAR(1 g) = 0.263 W/kg; SAR(10 g) = 0.176 W/kg
Maximum value of SAR (measured) = 0.283 W/kg

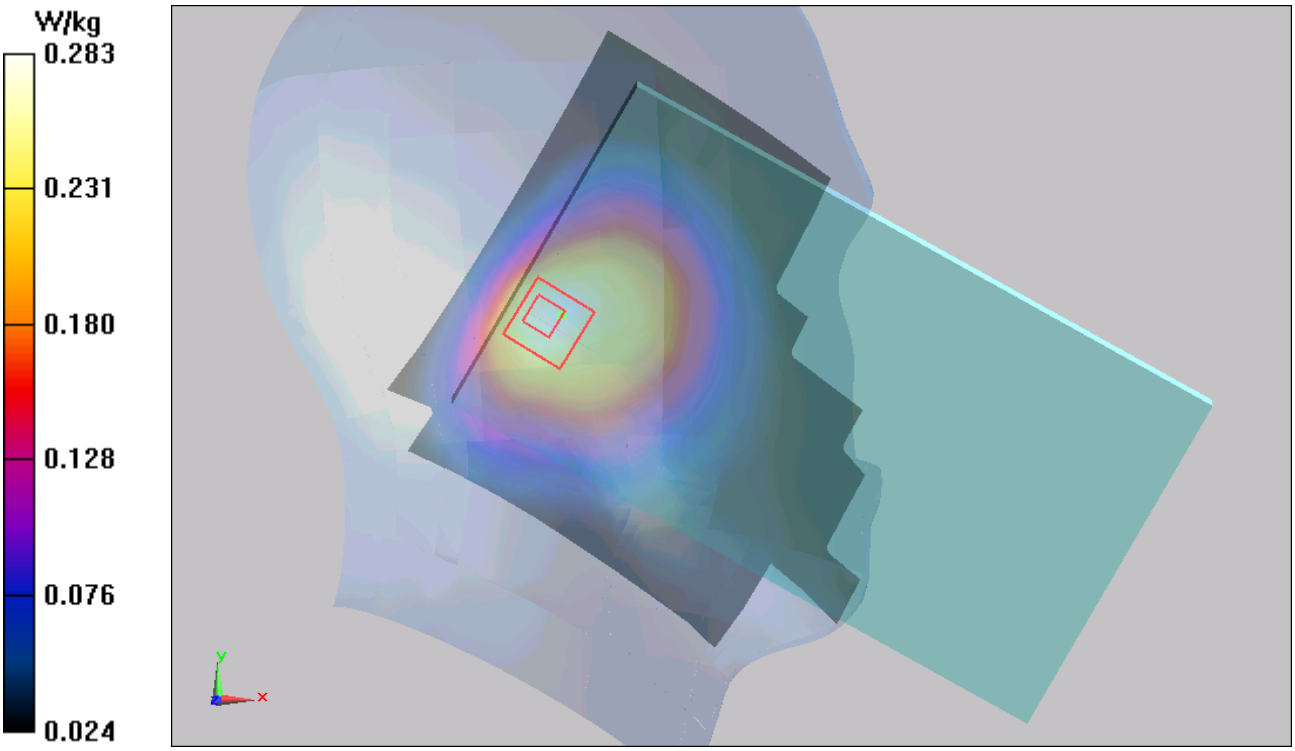


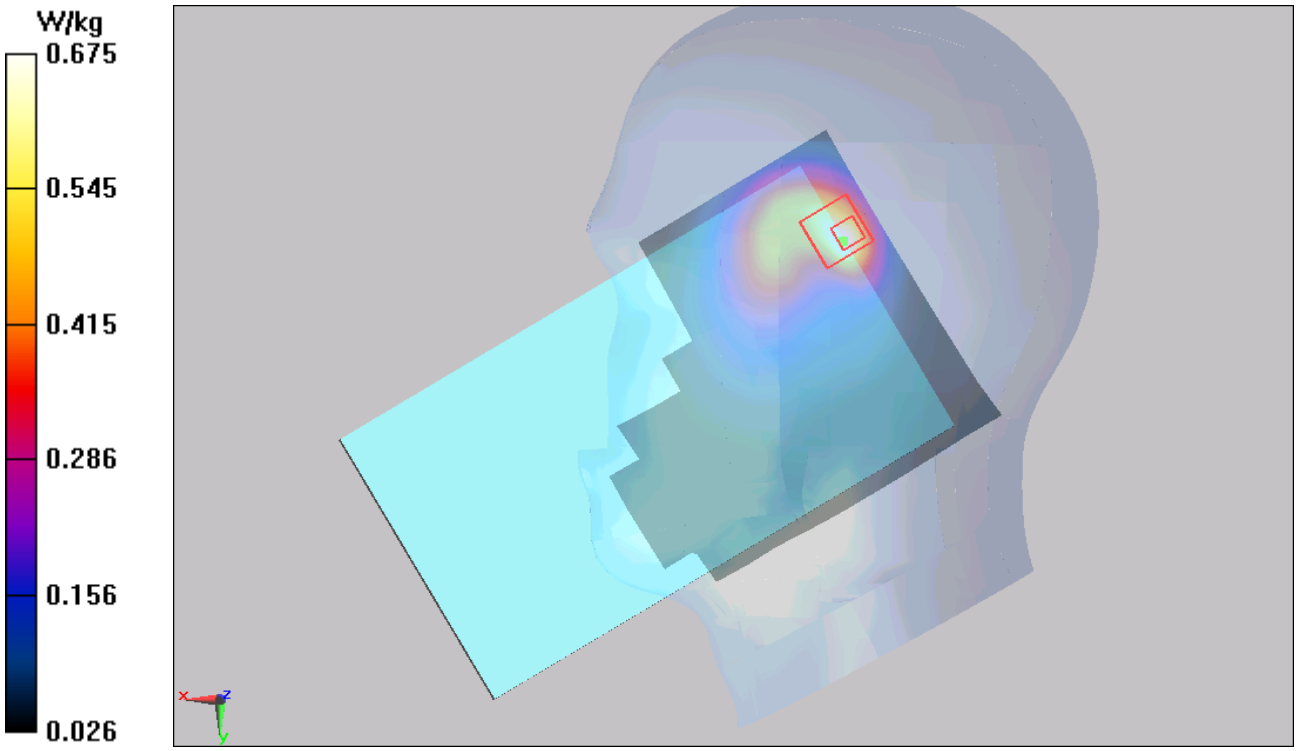
Figure 13 Left Hand Tilt 15° GSM 850 Channel 190

GSM 850 Right Cheek Middle

Date/Time: 3/20/2014 3:36:55 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Cheek Middle/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.726 W/kg

Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.585 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.594 W/kg; SAR(10 g) = 0.342 W/kg
Maximum value of SAR (measured) = 0.675 W/kg



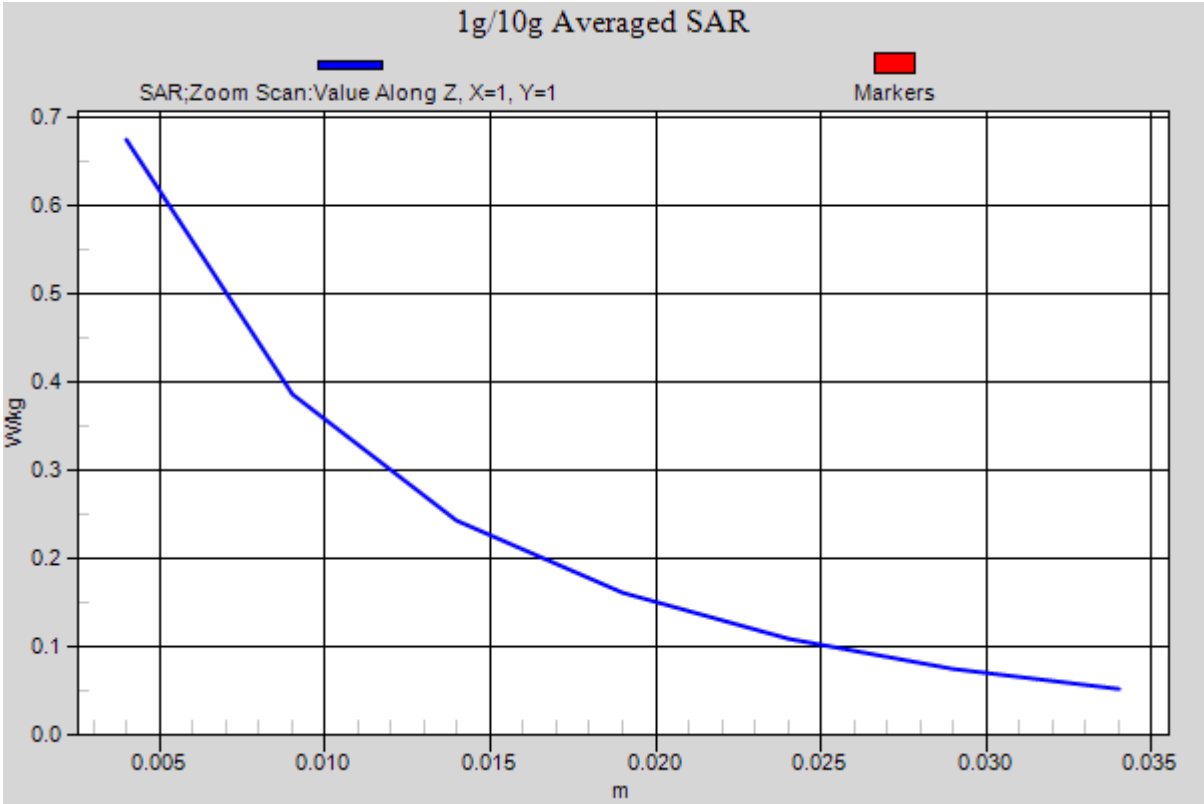


Figure 14 Right Hand Touch Cheek GSM 850 Channel 190

GSM 850 Right Tilt Middle

Date/Time: 3/20/2014 3:50:26 AM
Communication System: GSM; Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Tilt Middle/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.532 W/kg

Right Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.813 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.925 W/kg
SAR(1 g) = 0.510 W/kg; SAR(10 g) = 0.287 W/kg
Maximum value of SAR (measured) = 0.598 W/kg

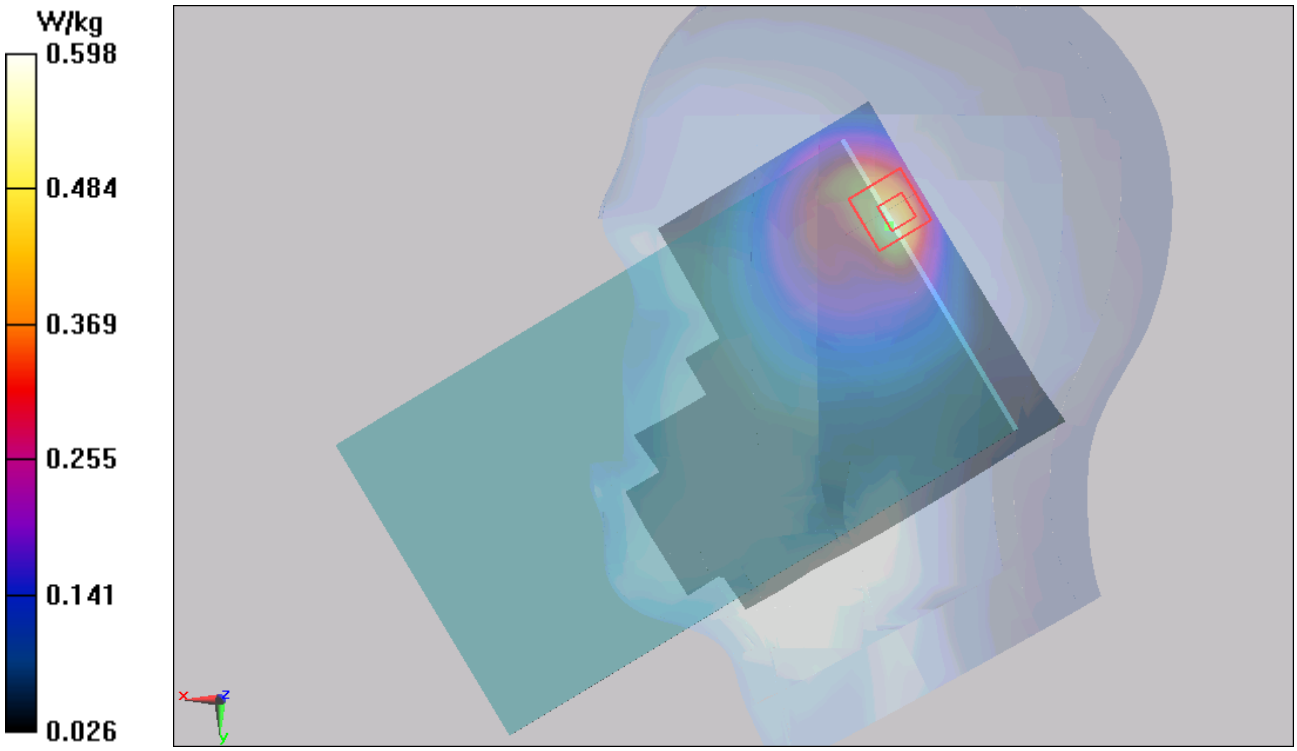


Figure 15 Right Hand Tilt 15° GSM 850 Channel 190

GSM 850 GPRS (3TXslots) with Test Position 1 High

Date/Time: 3/20/2014 3:20:24 PM
Communication System: GPRS 3TX; Frequency: 848.8 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 849 MHz; σ = 1.006 S/m; ε_r = 55.736; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 W/kg

Test Position 1 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.243 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 3.06 W/kg
SAR(1 g) = 0.927 W/kg; SAR(10 g) = 0.378 W/kg
Maximum value of SAR (measured) = 1.06 W/kg

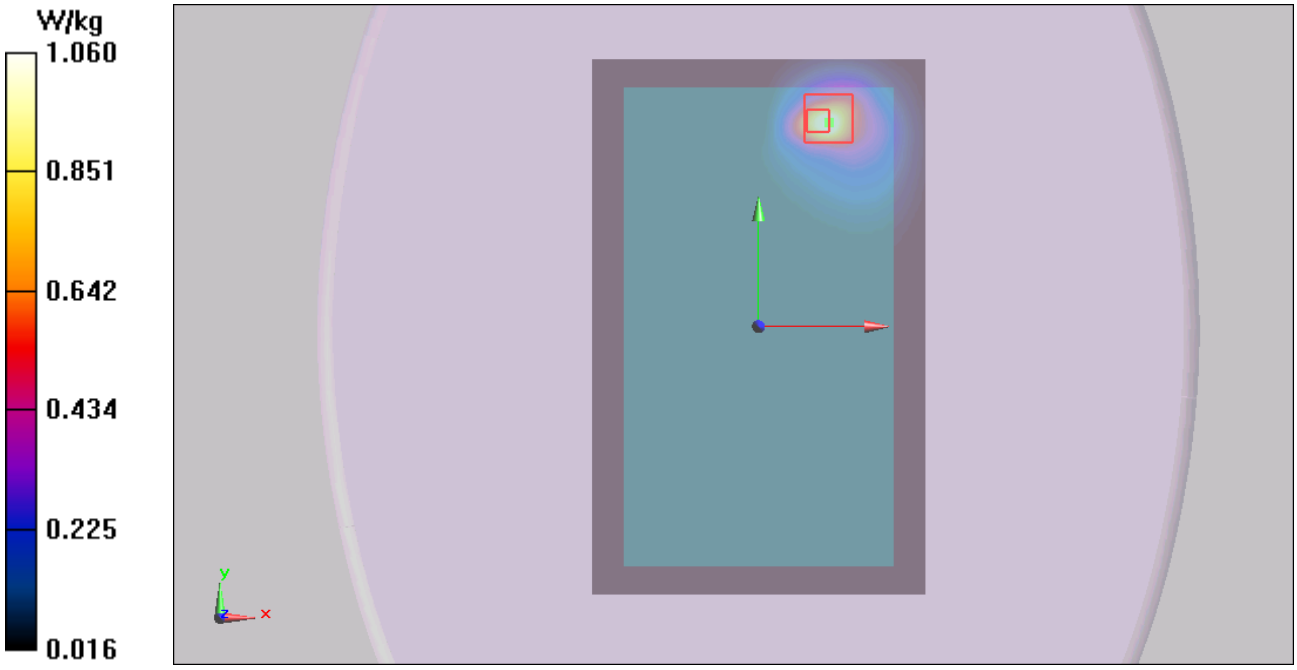


Figure 16 GSM 850 GPRS (3TXslots) with Test Position 1 Channel 251

GSM 850 GPRS (3TXslots) with Test Position 1 Middle

Date/Time: 3/20/2014 3:38:18 PM
Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.161 V/m; Power Drift = 0.171 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.452 W/kg
Maximum value of SAR (measured) = 1.27 W/kg

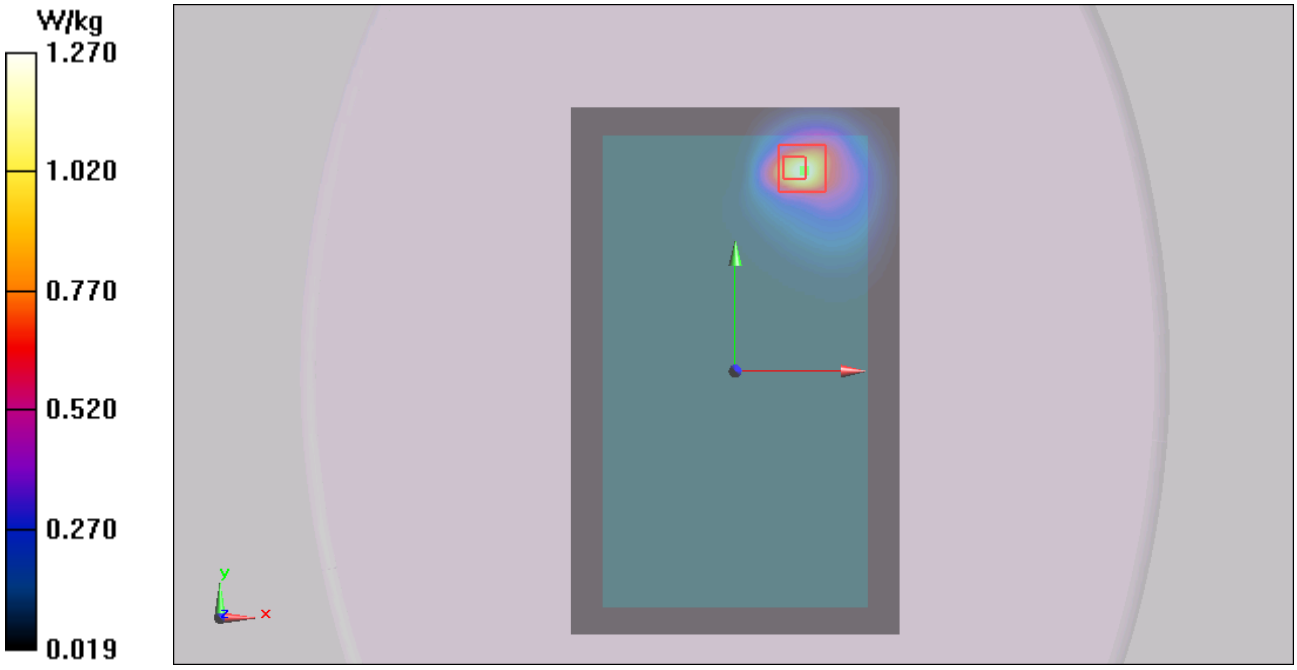


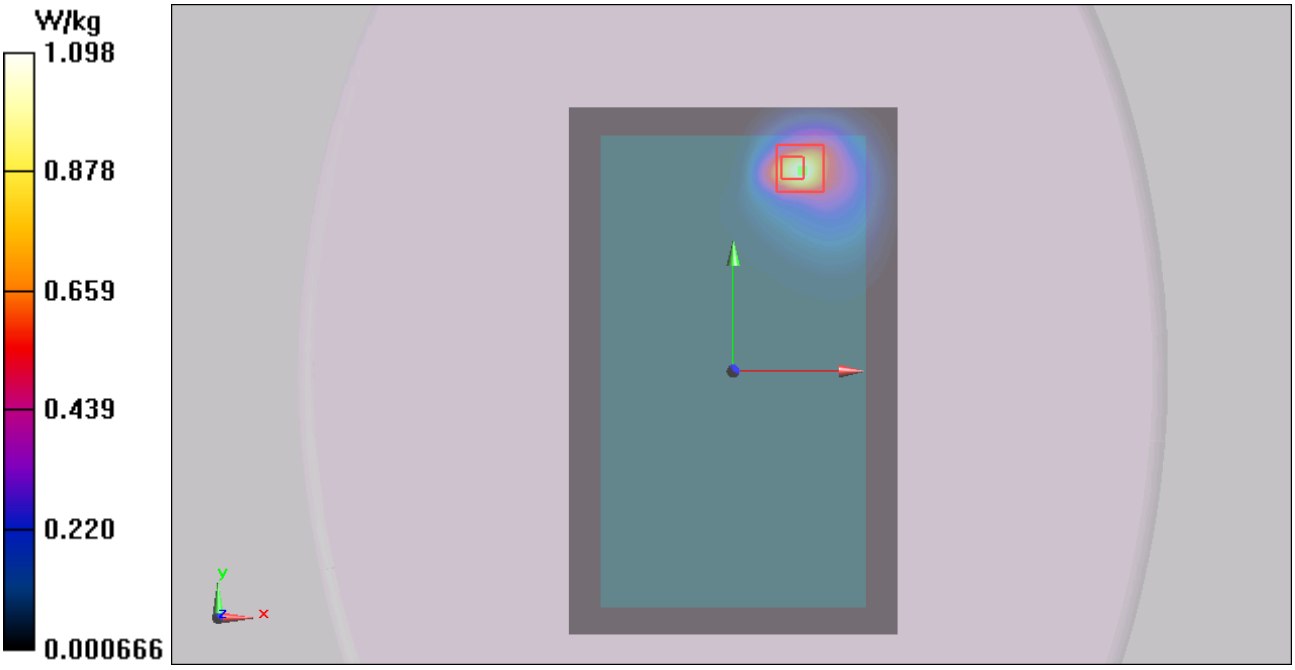
Figure 17 GSM 850 GPRS (3TXslots) with Test Position 1 Channel 190

GSM 850 GPRS (3TXslots) with Test Position 1 Low

Date/Time: 3/20/2014 3:03:37 PM
Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 S/m; ε_r = 55.938; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.10 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.857 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.557 W/kg
Maximum value of SAR (measured) = 1.50 W/kg



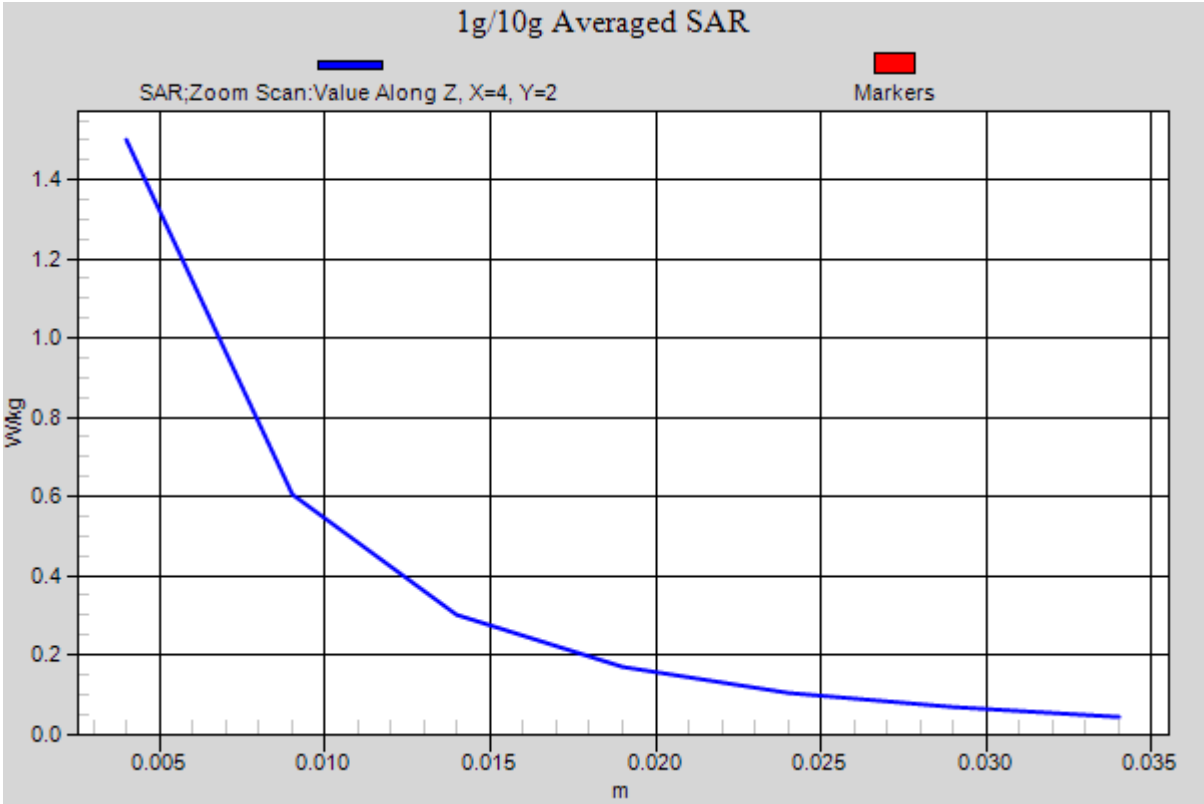


Figure 18 GSM 850 GPRS (3TXslots) with Test Position 1 Channel 128

GSM 850 GPRS (3TXslots) with Test Position 3 Middle

Date/Time: 3/20/2014 7:27:05 PM
Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 3 Middle/Area Scan (31x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.365 W/kg

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.767 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 0.511 W/kg
SAR(1 g) = 0.319 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 0.359 W/kg

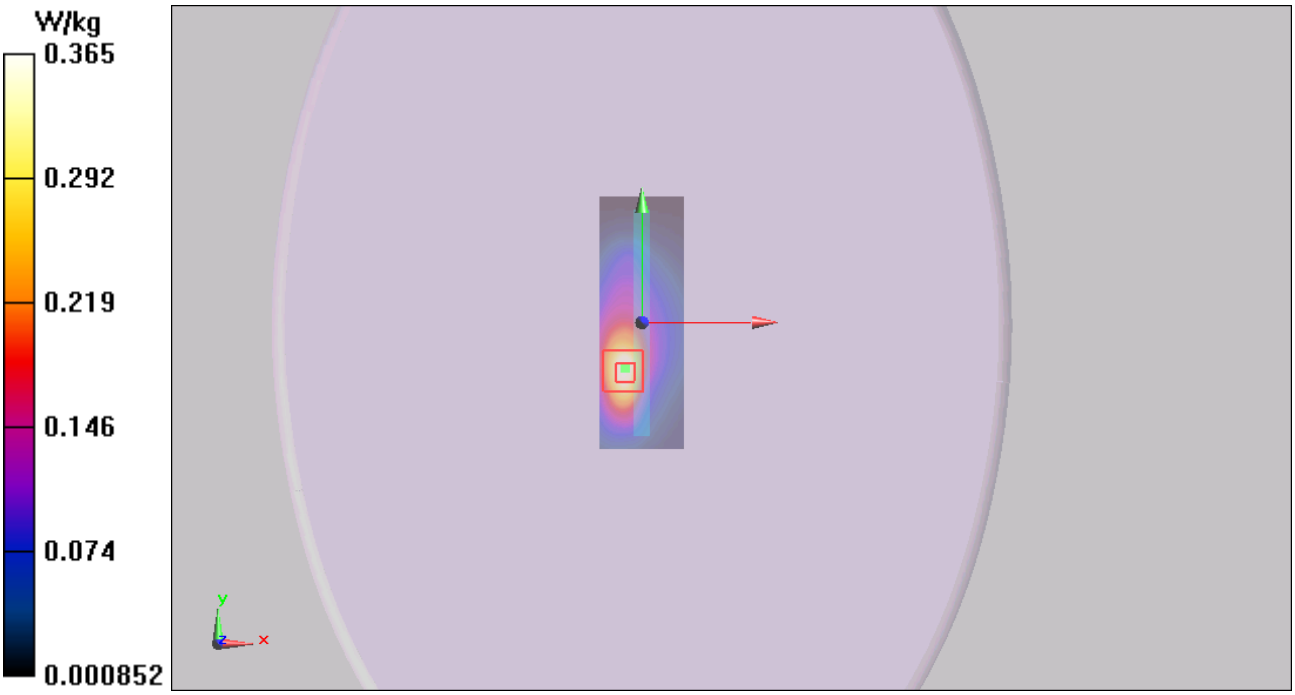


Figure 19 GSM 850 GPRS (3TXslots) with Test Position 3 Channel 190

GSM 850 GPRS (3TXslots) with Test Position 4 Middle

Date/Time: 3/20/2014 10:54:28 PM
Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 4 Middle/Area Scan (31x161x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.0385 W/kg

Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.780 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 0.0710 W/kg
SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.023 W/kg
Maximum value of SAR (measured) = 0.0401 W/kg

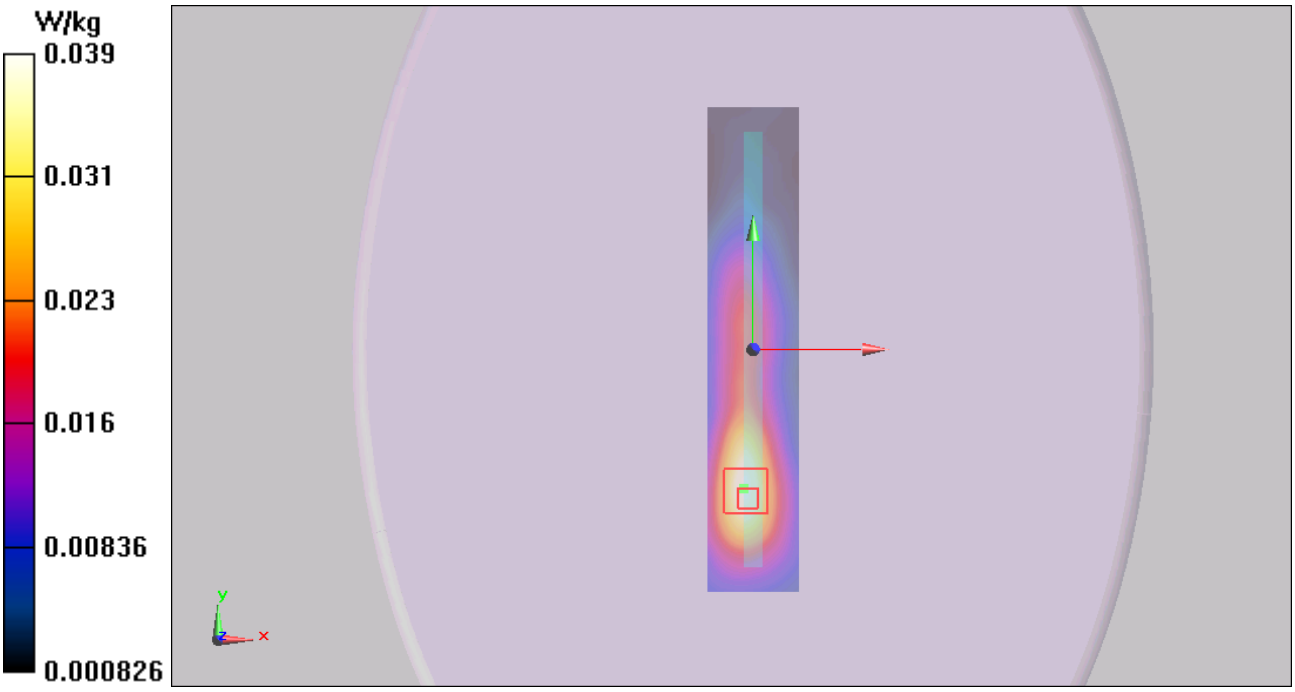


Figure 20 GSM 850 GPRS (3TXslots) with Test Position 4 Channel 190

GSM 850 GPRS (3TXslots) with Test Position 5 Middle

Date/Time: 3/20/2014 7:55:15 PM
Communication System: GPRS 3TX; Frequency: 836.6 MHz;Duty Cycle: 1:2.76694
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 5 Middle/Area Scan (31x161x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.260 W/kg

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.864 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.474 W/kg
SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.276 W/kg

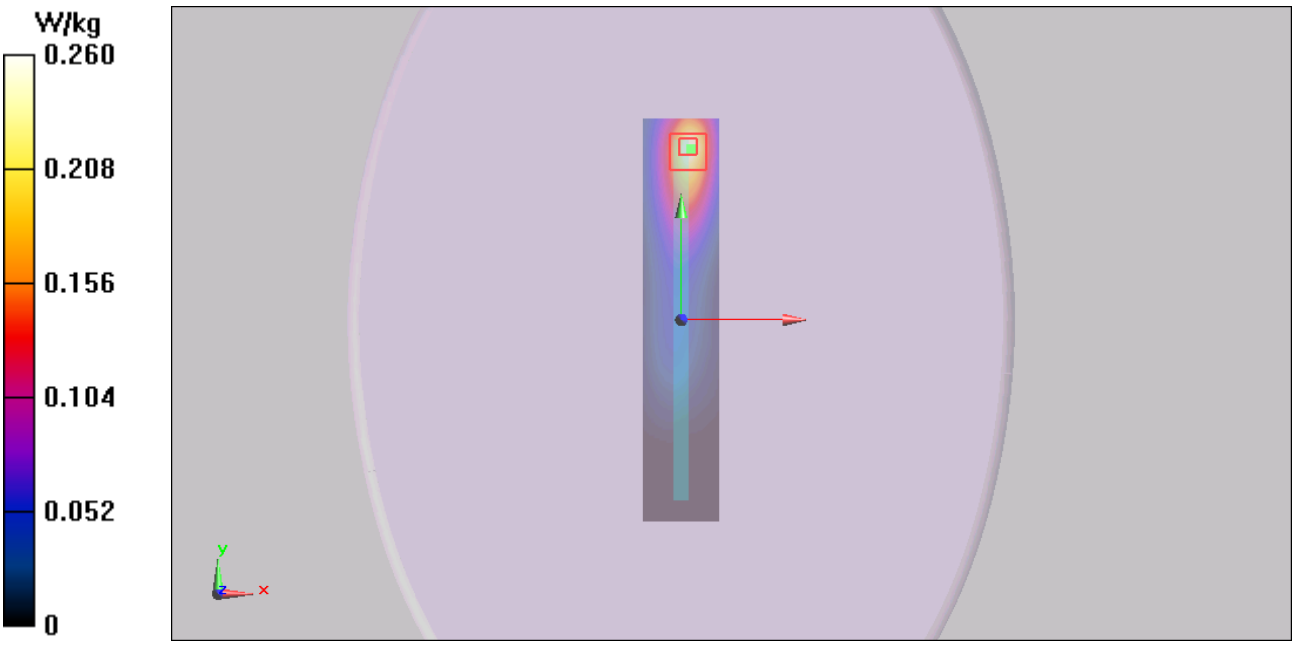


Figure 21 GSM 850 GPRS (3TXslots) with Test Position 5 Channel 190

GSM 850 EGPRS (3TXslots) with Test Position 1 Low

Date/Time: 3/20/2014 10:12:56 PM
Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 S/m; ε_r = 55.938; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.071 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.69 W/kg
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.604 W/kg
Maximum value of SAR (measured) = 1.34 W/kg

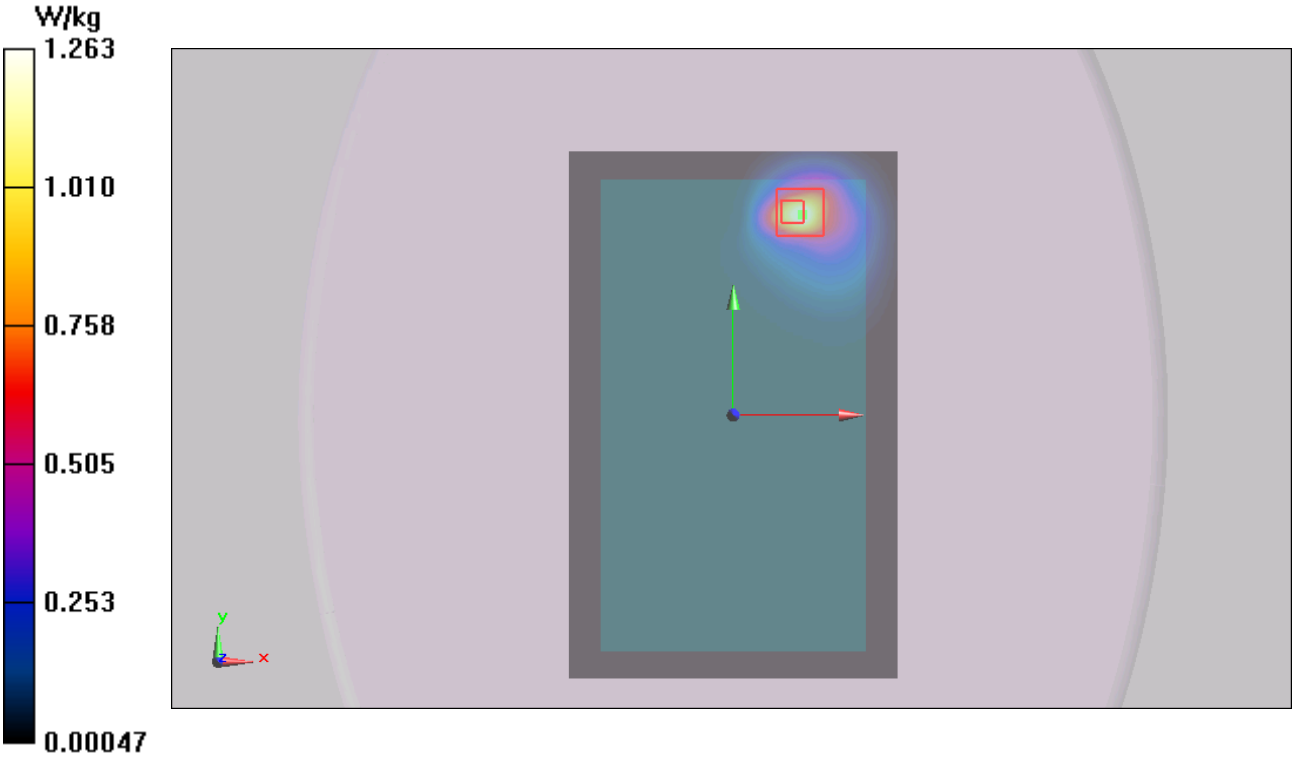


Figure 22 GSM 850 EGPRS (3TXslots) with Test Position 1 Channel 128

GSM 850 with Earphone Test Position 1 Low

Date/Time: 3/20/2014 10:32:16 PM
Communication System: GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 S/m; ε_r = 55.938; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.018 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 1.24 W/kg

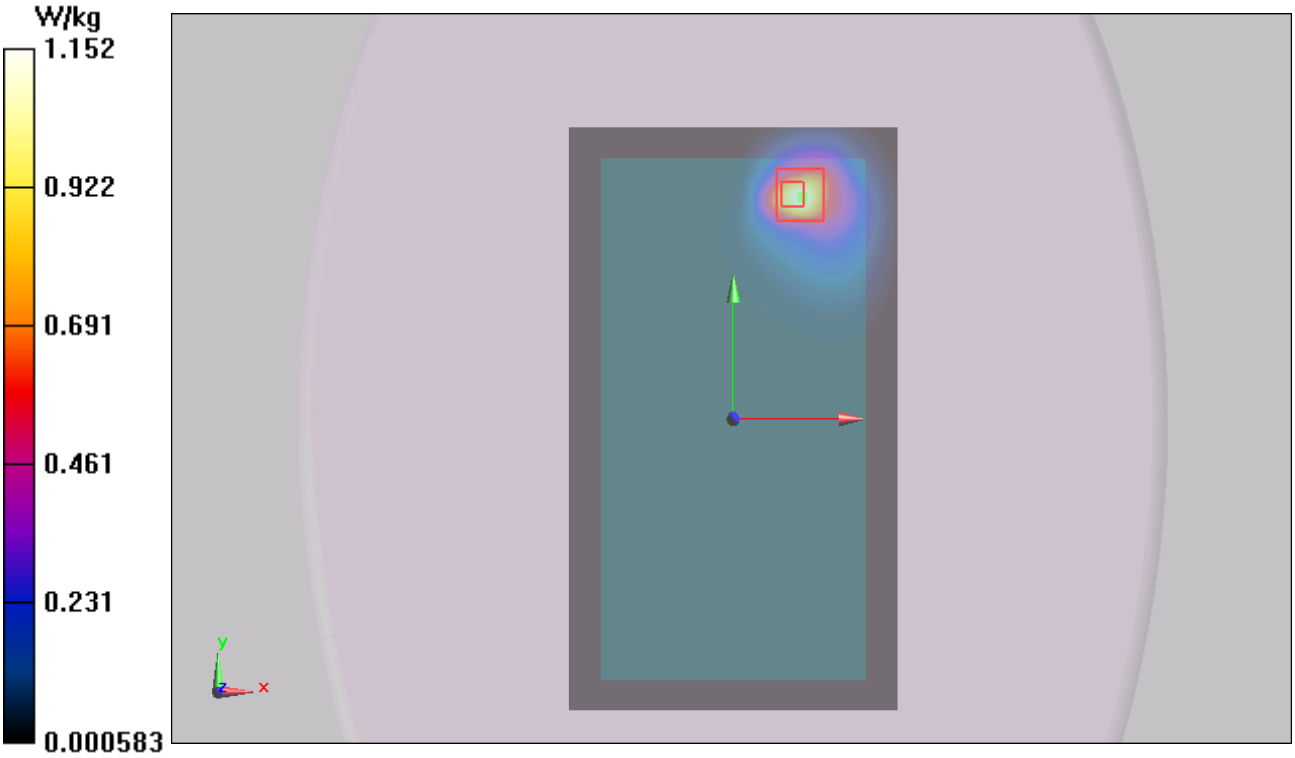


Figure 23 GSM 850 with Earphone, Test Position 1 Channel 128

GSM 850 GPRS (3TXslots) with Test Position 1 Low (1st Repeated SAR)

Date/Time: 3/20/2014 9:30:12 PM

Communication System: GPRS 3TX; Frequency: 824.2 MHz;Duty Cycle: 1:2.76694

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 S/m; ε_r = 55.938; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.36 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.599 V/m; Power Drift = 0.106 dB

Peak SAR (extrapolated) = 2.75 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.604 W/kg

Maximum value of SAR (measured) = 1.34 W/kg

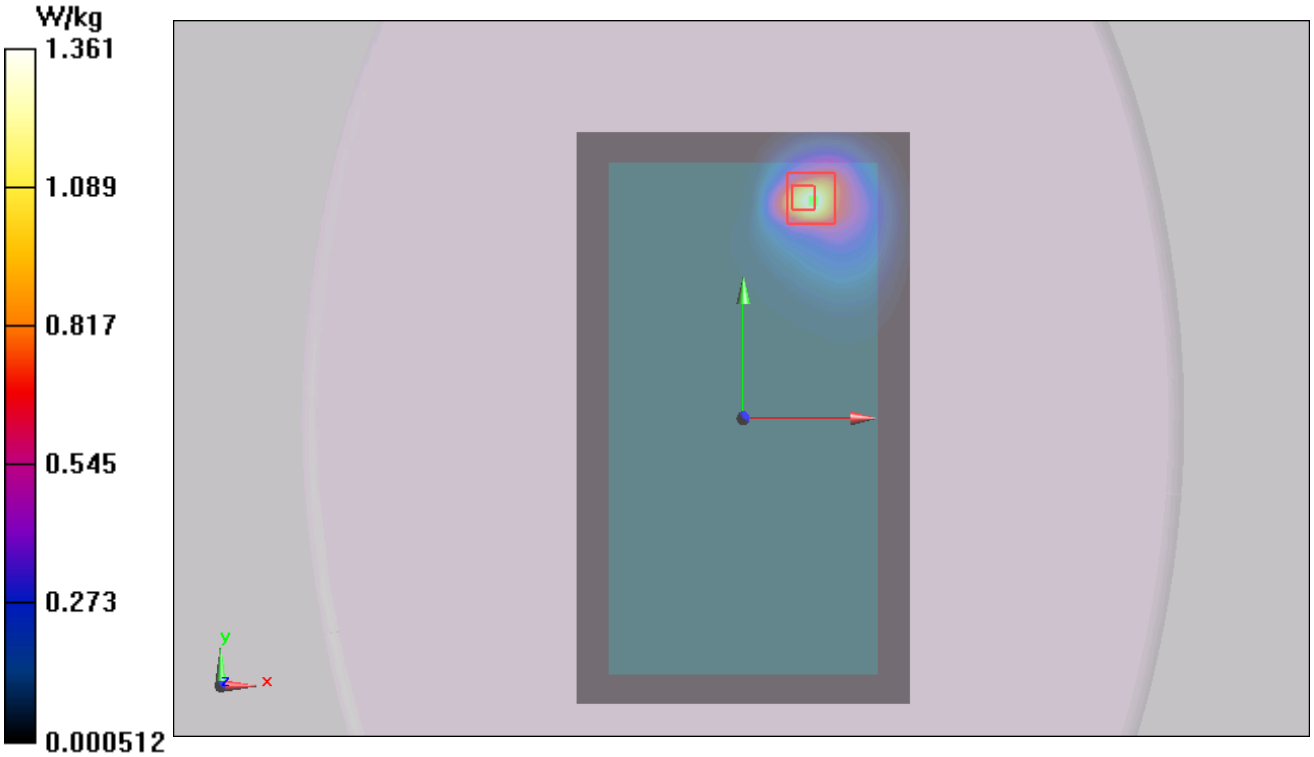


Figure 24 GSM 850 GPRS (3TXslots) with Test Position 1 Channel 128

GSM 1900 Left Cheek Middle

Date/Time: 3/16/2014 2:31:27 PM

Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042

Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left/Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.0839 W/kg

Left/Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.871 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 0.120 W/kg

SAR(1 g) = 0.076 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.0807 W/kg

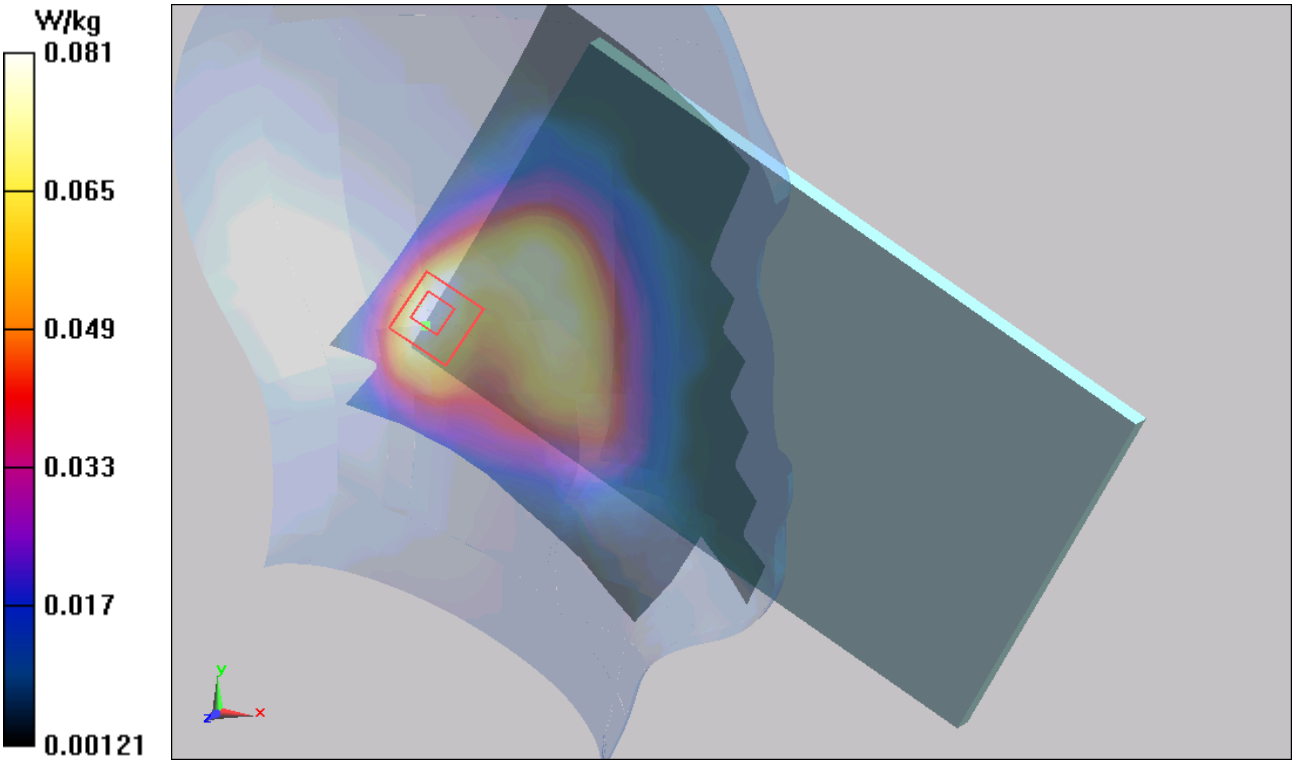


Figure 25 Left Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Left Tilt Middle

Date/Time: 3/16/2014 2:51:51 PM

Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042

Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left/Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.0745 W/kg

Left/Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.803 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.104 W/kg

SAR(1 g) = 0.066 W/kg; SAR(10 g) = 0.038 W/kg

Maximum value of SAR (measured) = 0.0673 W/kg

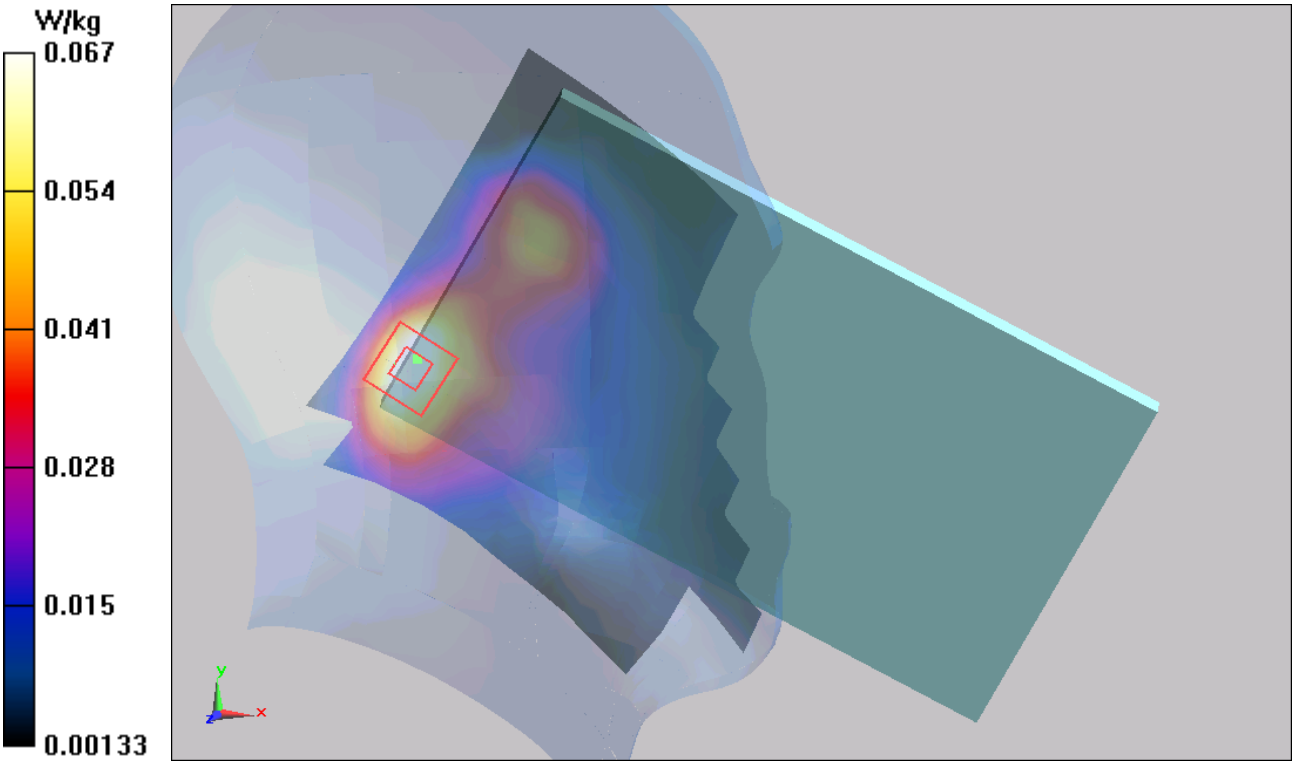


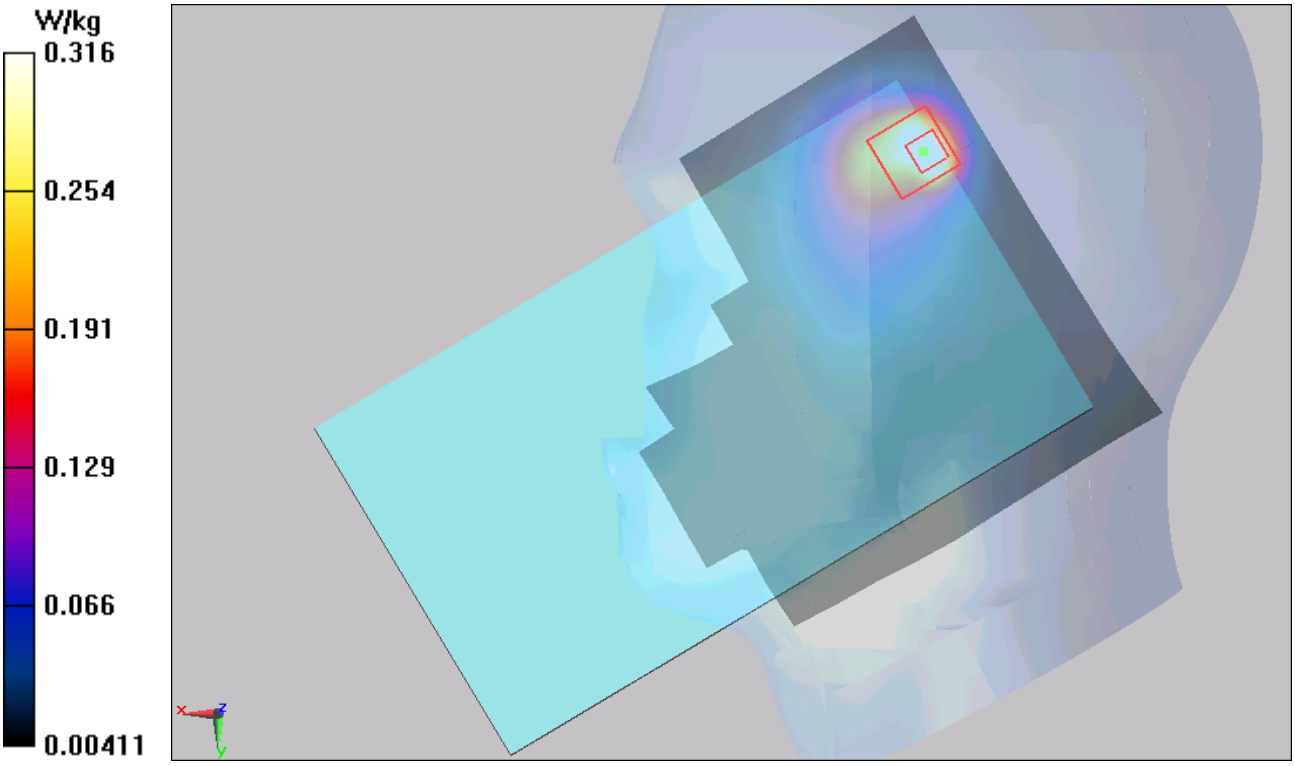
Figure 26 Left Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 Right Cheek Middle

Date/Time: 3/16/2014 4:50:48 PM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right/Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.411 W/kg

Right/Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.755 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 0.562 W/kg
SAR(1 g) = 0.314 W/kg; SAR(10 g) = 0.160 W/kg
Maximum value of SAR (measured) = 0.316 W/kg



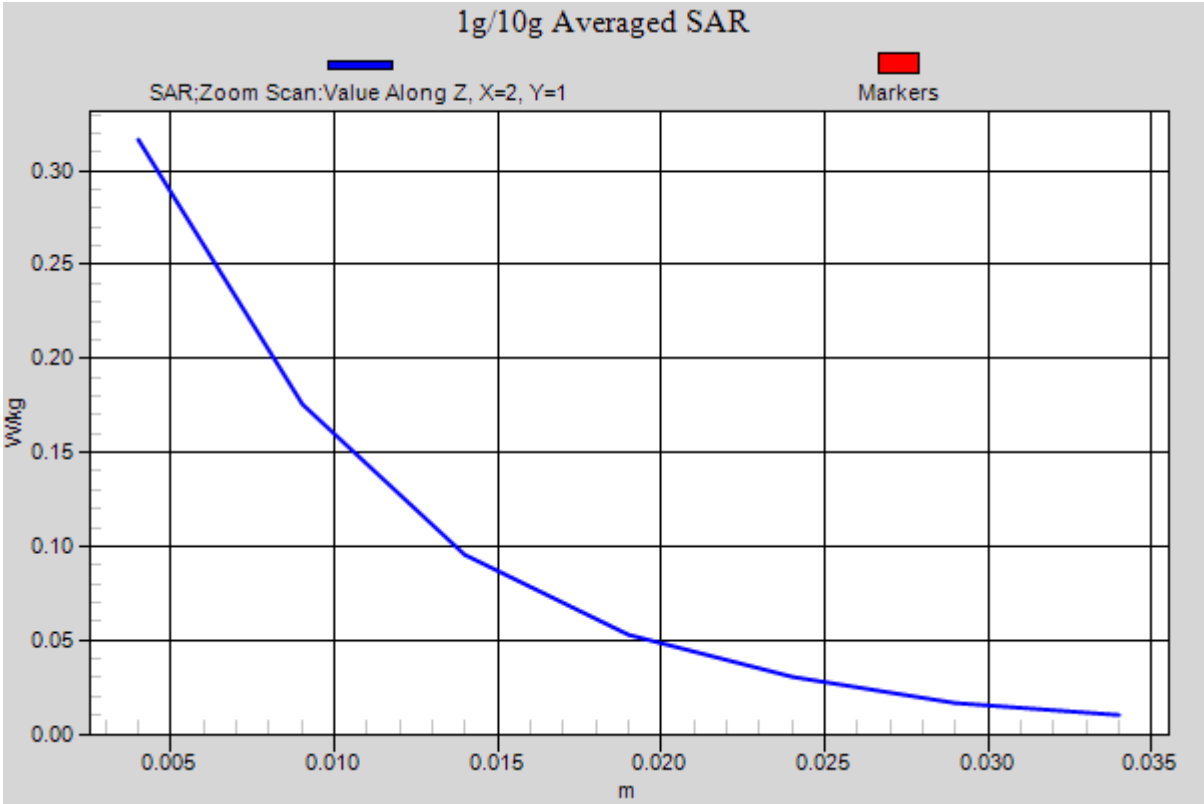


Figure 27 Right Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 Right Tilt Middle

Date/Time: 3/16/2014 4:32:06 PM
Communication System: GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right/Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.307 W/kg

Right/Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.976 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.395 W/kg
SAR(1 g) = 0.227 W/kg; SAR(10 g) = 0.117 W/kg
Maximum value of SAR (measured) = 0.225 W/kg

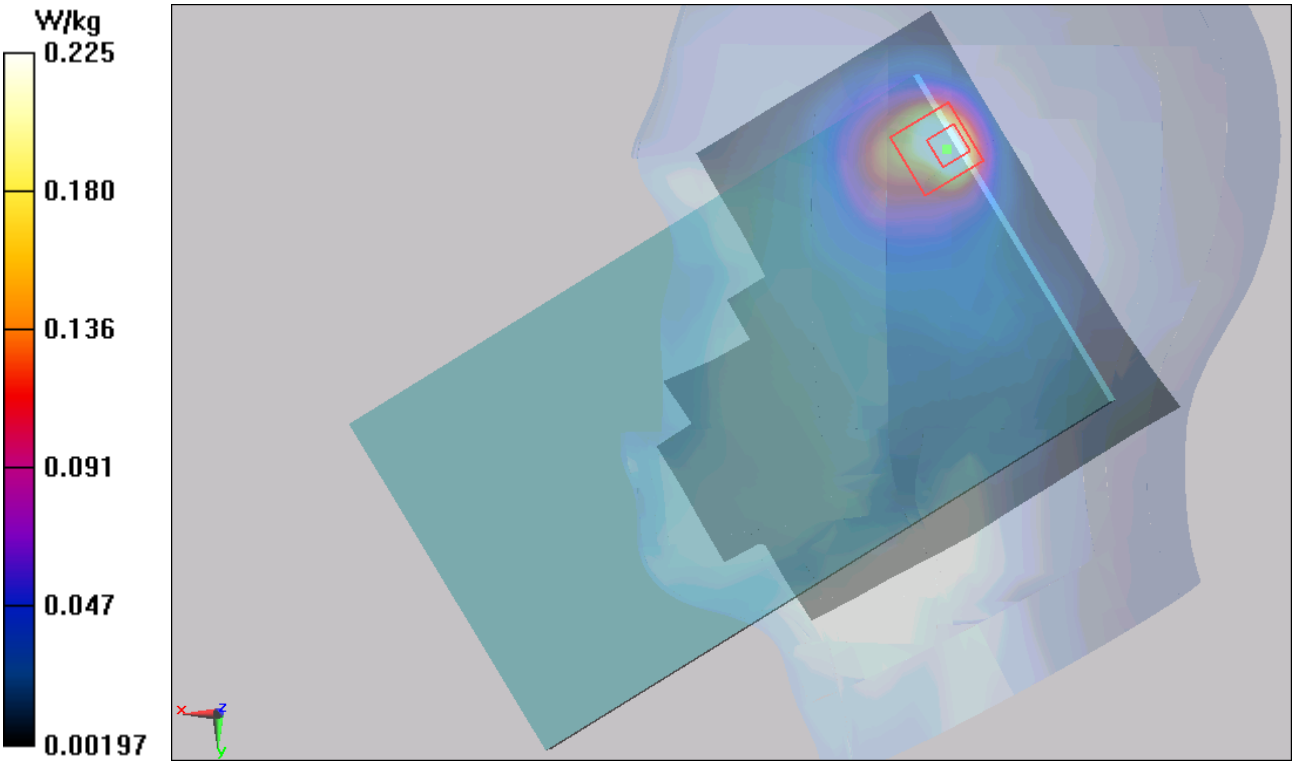


Figure 28 Right Hand Tilt 15° GSM 1900 Channel 661

GSM 1900 GPRS (2TXslots) with Test Position 1 High

Date/Time: 3/10/2014 6:05:34 PM
Communication System: GPRS 2TX; Frequency: 1909.8 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 1910 MHz; σ = 1.531 S/m; ε_r = 52.629; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.890 W/kg

Test Position 1 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.542 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.824 W/kg; SAR(10 g) = 0.387 W/kg
Maximum value of SAR (measured) = 0.923 W/kg

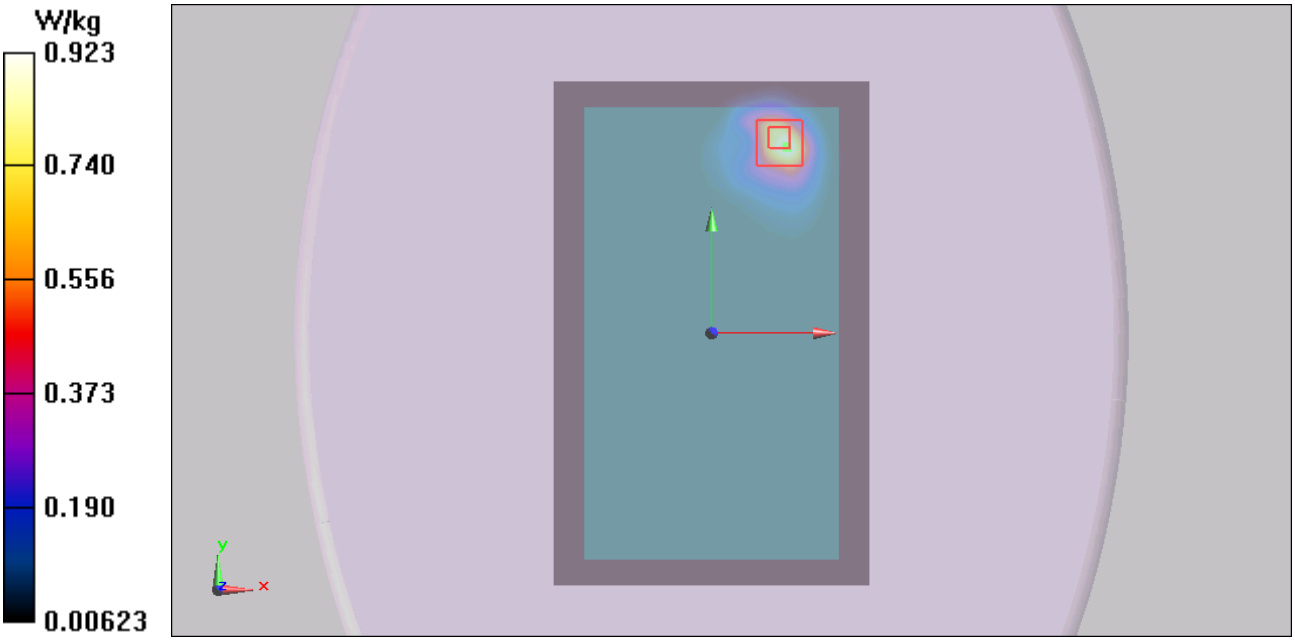


Figure 29 GSM 1900 GPRS (2TXslots) with Test Position 1 Channel 810

GSM 1900 GPRS (2TXslots) with Test Position 1 Middle

Date/Time: 3/10/2014 5:18:43 PM
Communication System: GPRS 2TX; Frequency: 1880 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.02 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.525 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 2.03 W/kg
SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.426 W/kg
Maximum value of SAR (measured) = 0.995 W/kg

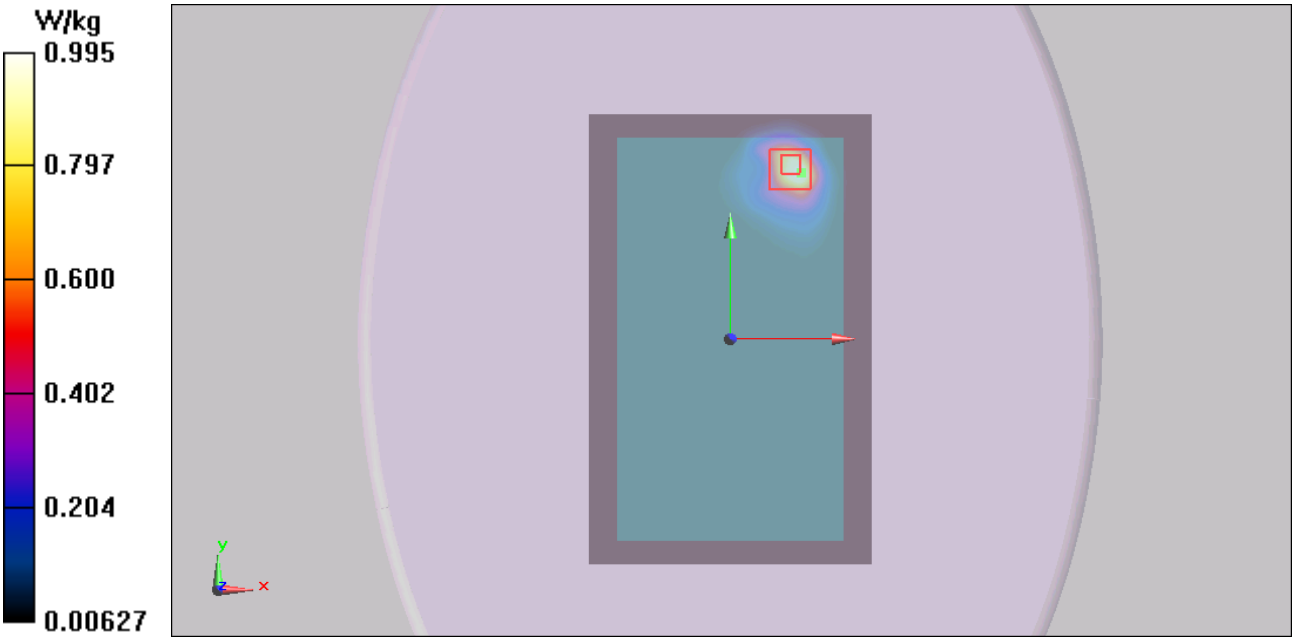


Figure 30 GSM 1900 GPRS (2TXslots) with Test Position 1 Channel 661

GSM 1900 GPRS (2TXslots) with Test Position 1 Low

Date/Time: 3/10/2014 6:51:08 PM
Communication System: GPRS 2TX; Frequency: 1850.2 MHz;Duty Cycle: 1:4.14954
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.462 S/m; ε_r = 52.753; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.02 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.575 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 2.13 W/kg
SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.458 W/kg
Maximum value of SAR (measured) = 1.03 W/kg

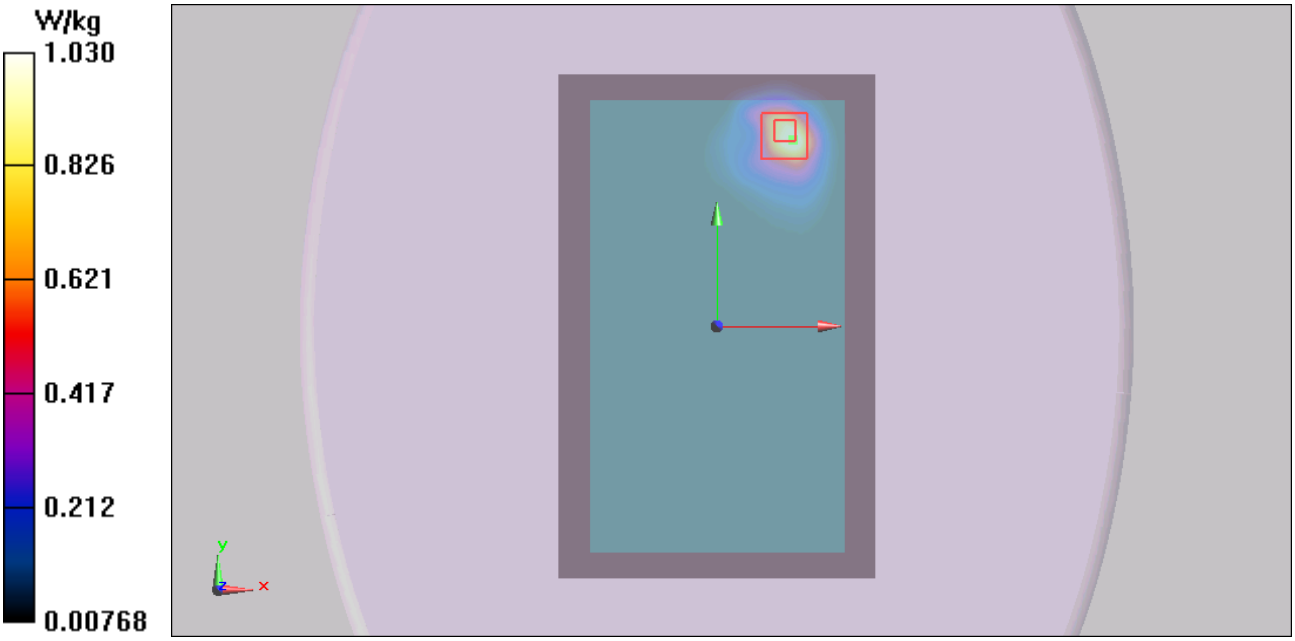


Figure 31 GSM 1900 GPRS (2TXslots) with Test Position 1 Channel 512

GSM 1900 GPRS (2TXslots) with Test Position 3 Middle

Date/Time: 3/10/2014 10:11:06 AM
Communication System: GPRS 2TX; Frequency: 1880 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 3 Middle/Area Scan (31x91x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.286 W/kg

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.456 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.246 W/kg; SAR(10 g) = 0.113 W/kg
Maximum value of SAR (measured) = 0.305 W/kg

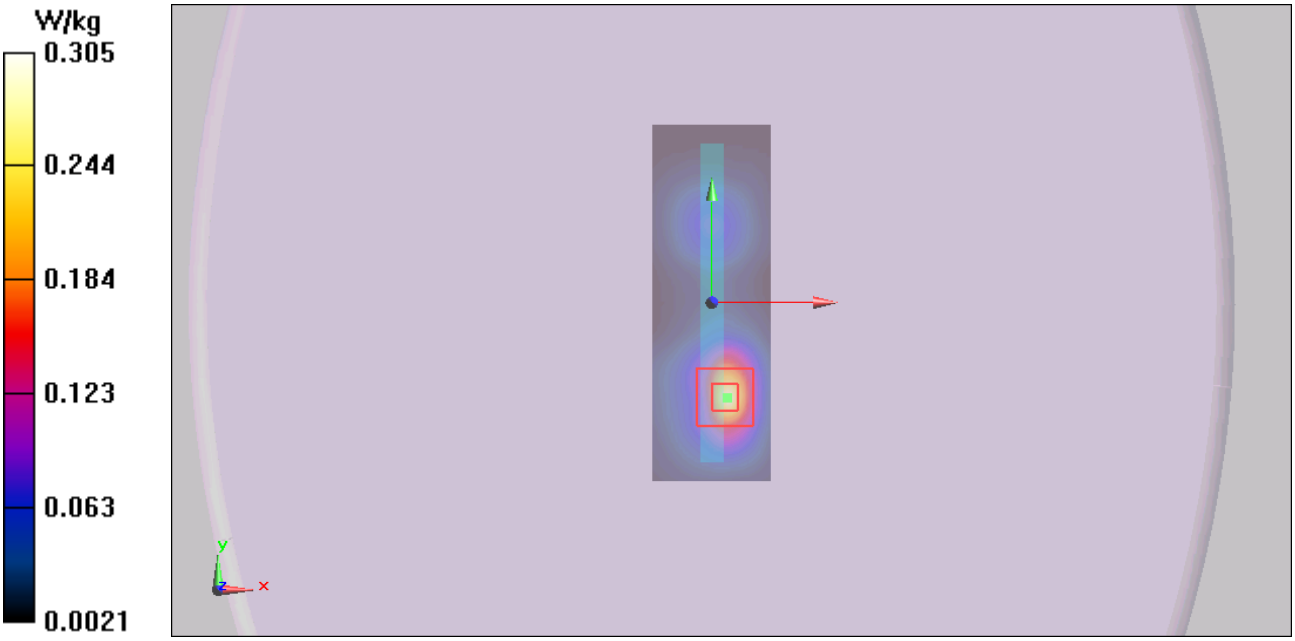


Figure 32 GSM 1900 GPRS (2TXslots) with Test Position 3 Channel 661

GSM 1900 GPRS (2TXslots) with Test Position 5 Middle

Date/Time: 3/10/2014 9:37:43 AM
Communication System: GPRS 2TX; Frequency: 1880 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 5 Middle/Area Scan (31x161x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.188 W/kg

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.174 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 0.367 W/kg
SAR(1 g) = 0.174 W/kg; SAR(10 g) = 0.081 W/kg
Maximum value of SAR (measured) = 0.189 W/kg

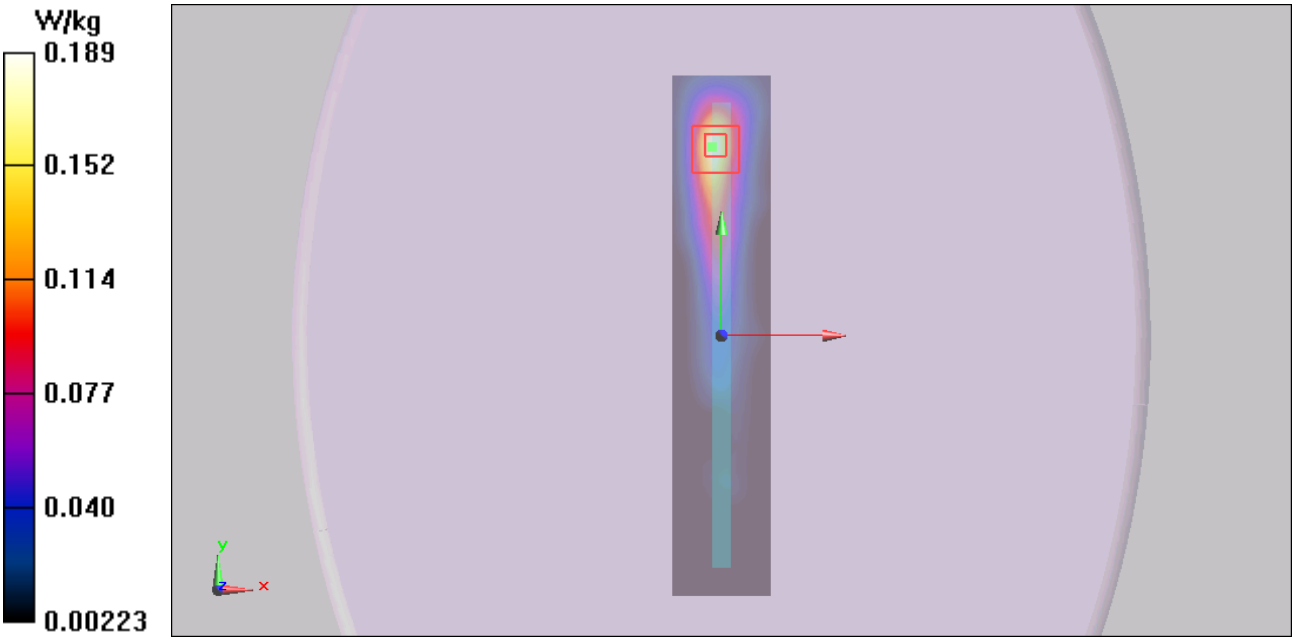


Figure 33 GSM 1900 GPRS (2TXslots) with Test Position 5 Channel 661

GSM 1900 EGPRS (2TXslots) with Test Position 1 Low

Date/Time: 3/10/2014 3:33:32 AM
Communication System: EGPRS 2TX; Frequency: 1850.2 MHz;Duty Cycle: 1:4.14954
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.462 S/m; ε_r = 52.753; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.944 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.100 dB
Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 0.988 W/kg; SAR(10 g) = 0.459 W/kg
Maximum value of SAR (measured) = 1.03 W/kg

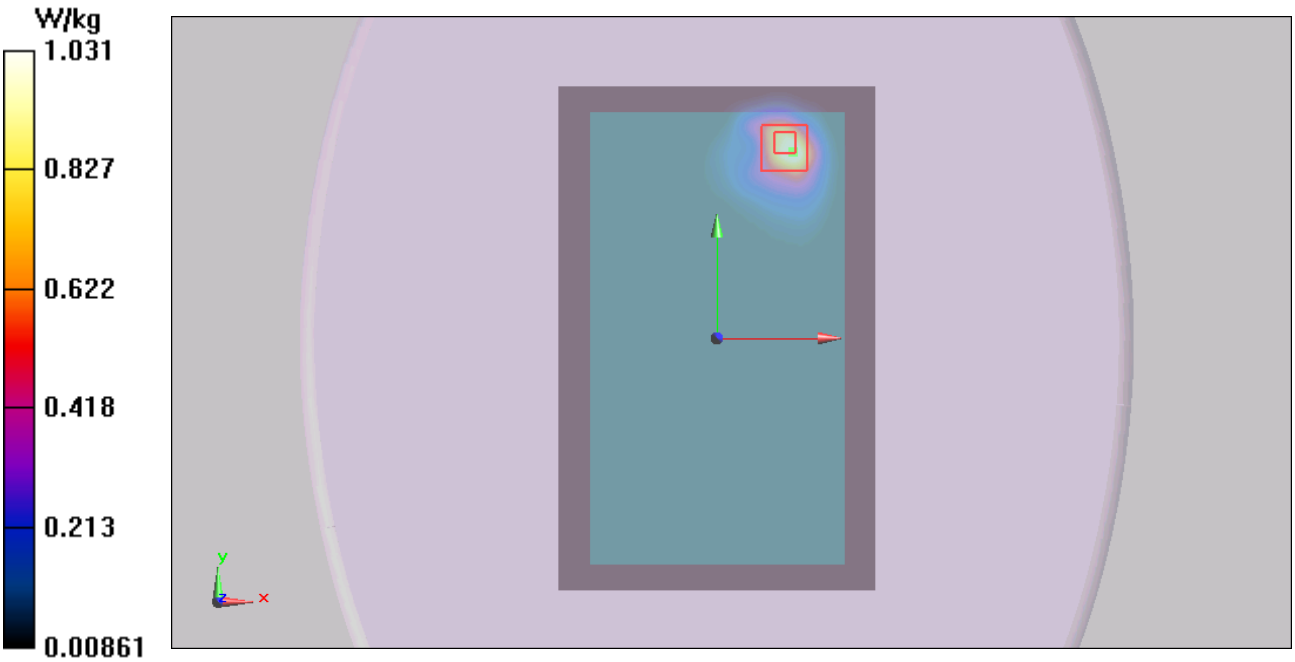


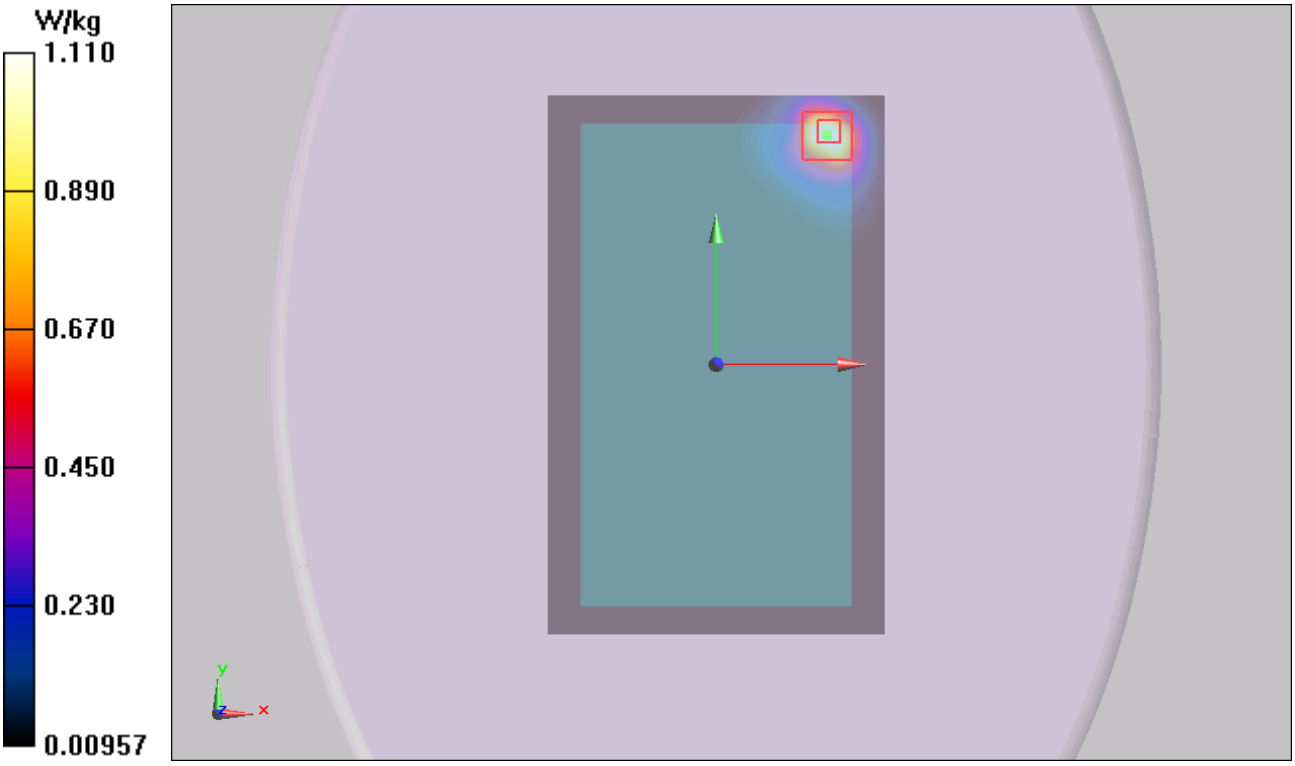
Figure 34 GSM 1900 EGPRS (2TXslots) with Test Position 1 Channel 512

GSM 1900 EGPRS (2TXslots) with Test Position 1 Low (1st Repeated SAR)

Date/Time: 3/10/2014 10:21:15 PM
Communication System: EGPRS 2TX; Frequency: 1850.2 MHz;Duty Cycle: 1:4.14954
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.462 S/m; ε_r = 52.753; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.28 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.542 V/m; Power Drift = 0.0577 dB
Peak SAR (extrapolated) = 2.28 W/kg
SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.483 W/kg
Maximum value of SAR (measured) = 1.11 W/kg



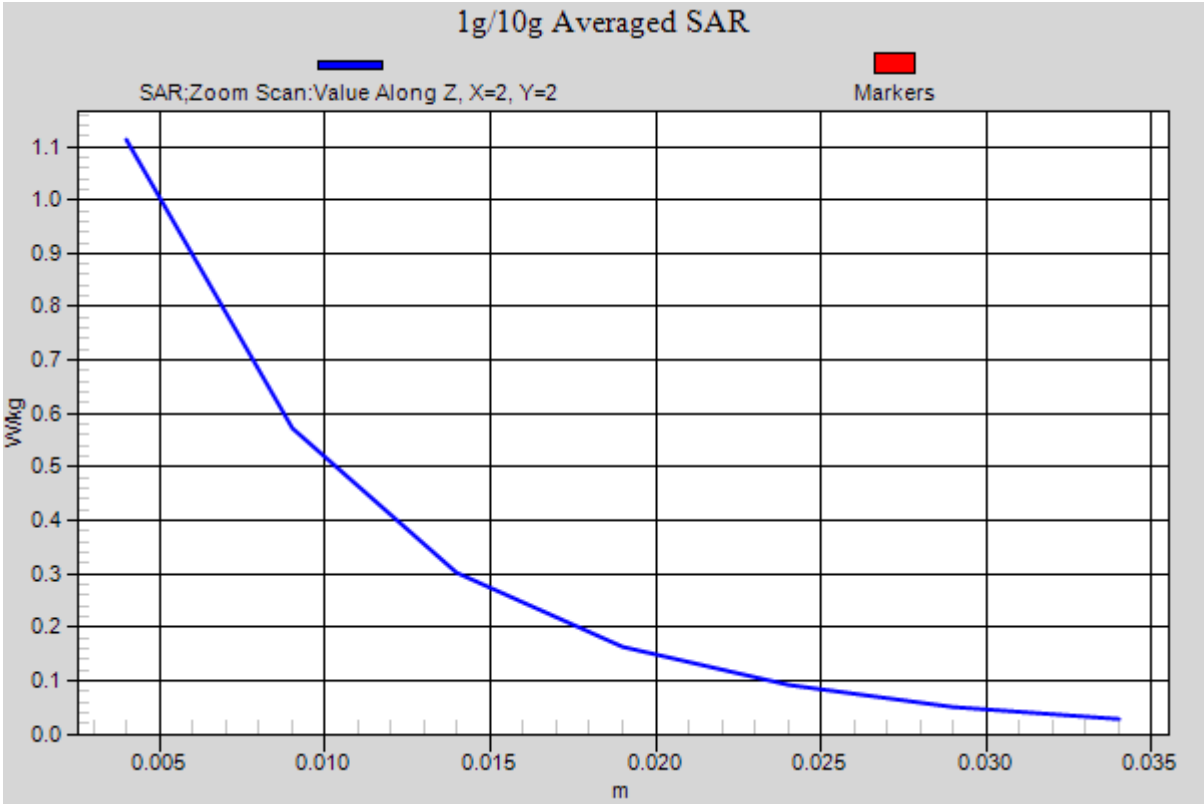


Figure 35 GSM 1900 EGPRS (2TXslots) with Test Position 1 Channel 512

UMTS Band II Left Cheek Middle

Date/Time: 3/16/2014 10:46:16 AM

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left/Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.104 W/kg

Left/Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.743 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.095 W/kg; SAR(10 g) = 0.054 W/kg

Maximum value of SAR (measured) = 0.0970 W/kg

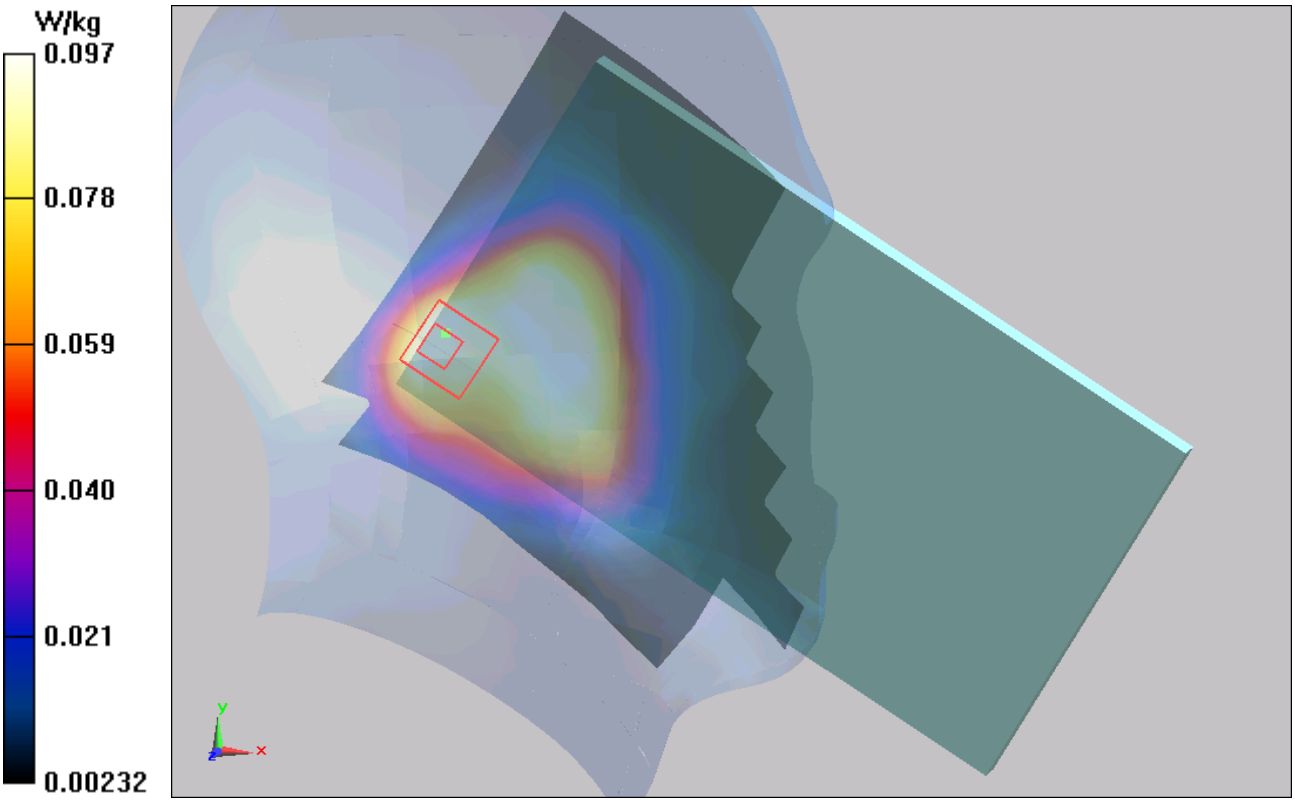


Figure 36 Left Hand Touch Cheek UMTS Band II Channel 9400

UMTS Band II Left Tilt Middle

Date/Time: 3/16/2014 3:18:21 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left/Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.0716 W/kg

Left/Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.800 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 0.102 W/kg
SAR(1 g) = 0.064 W/kg; SAR(10 g) = 0.037 W/kg
Maximum value of SAR (measured) = 0.0658 W/kg

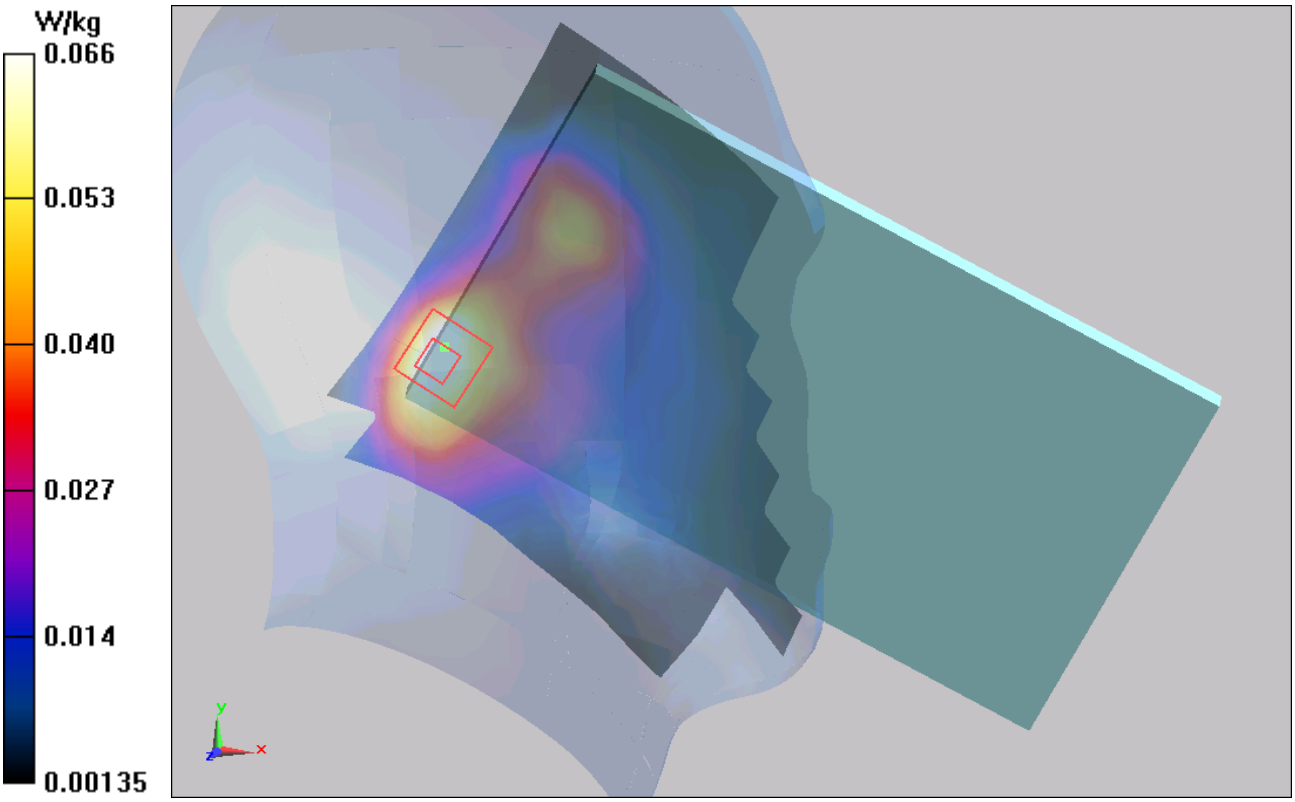


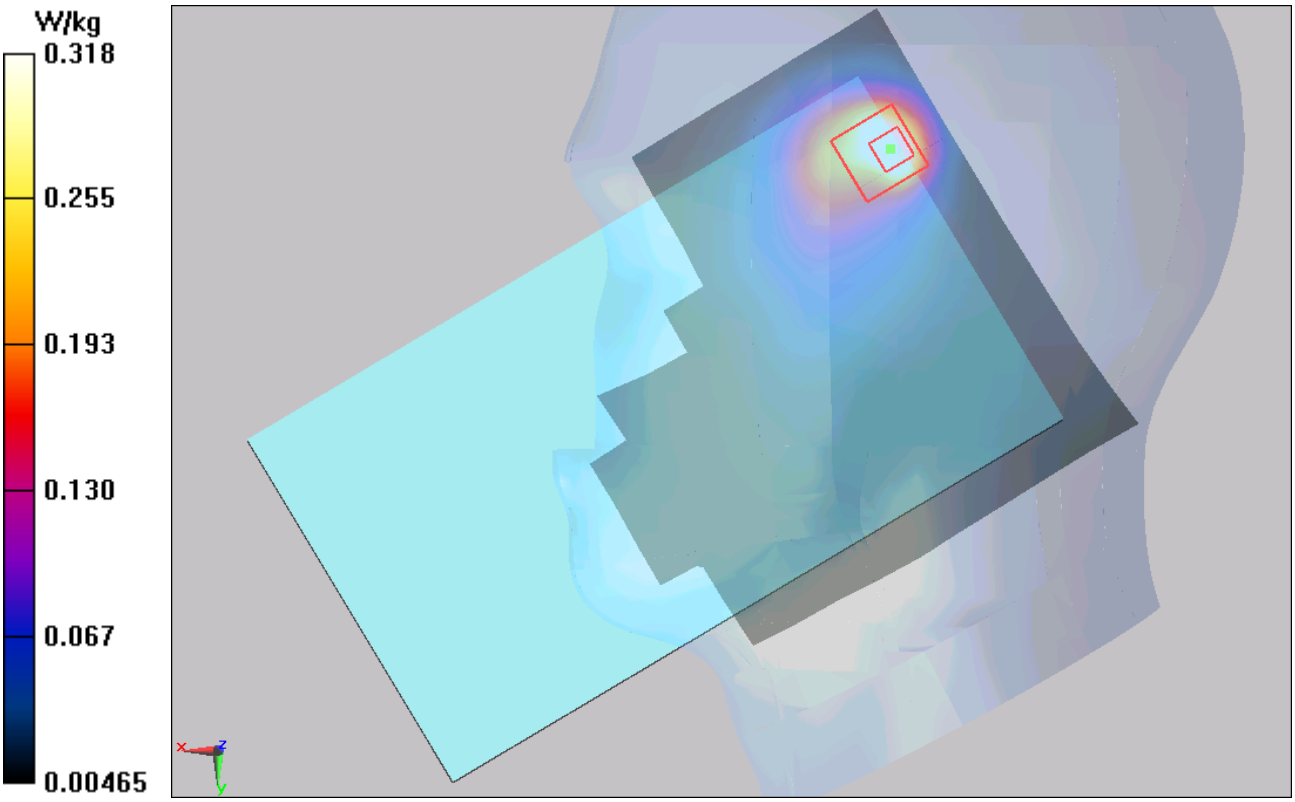
Figure 37 Left Hand Tilt 15° UMTS Band II Channel 9400

UMTS Band II Right Cheek Middle

Date/Time: 3/16/2014 3:43:13 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right/Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.429 W/kg

Right/Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.121 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.561 W/kg
SAR(1 g) = 0.316 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 0.318 W/kg



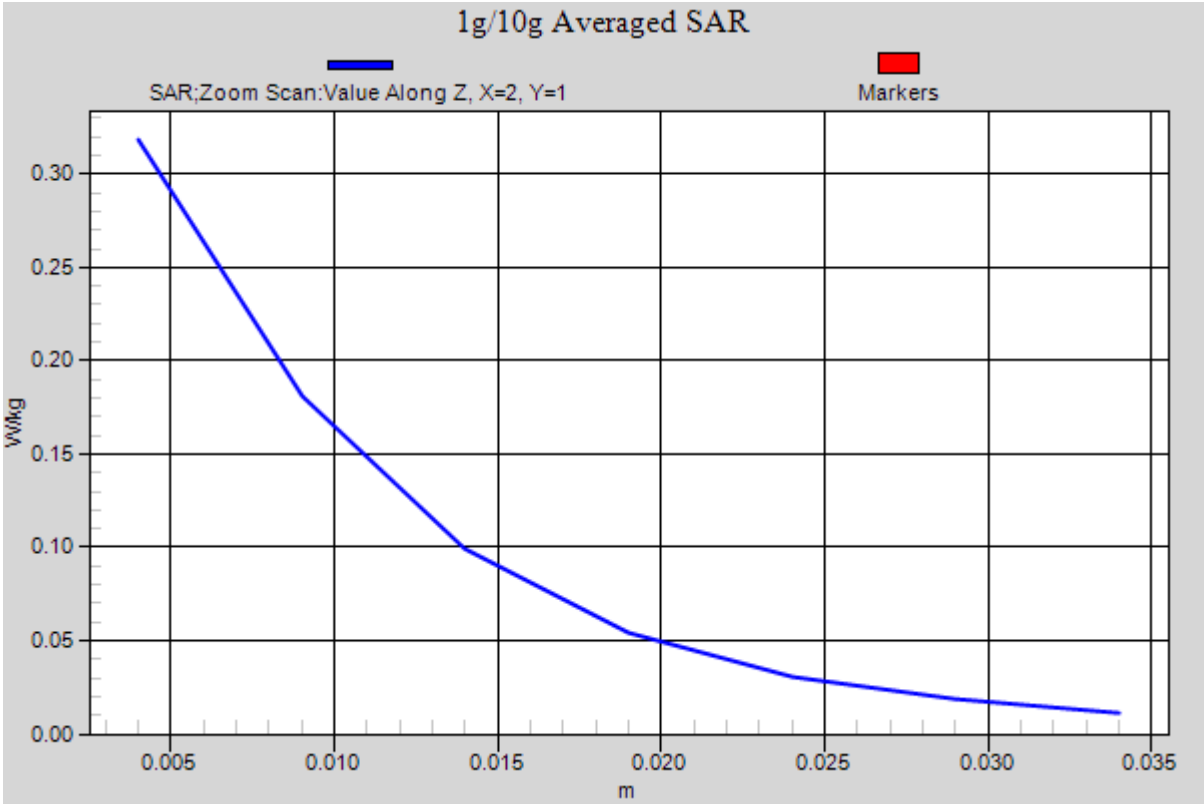


Figure 38 Right Hand Touch Cheek UMTS Band II Channel 9400

UMTS Band II Right Tilt Middle

Date/Time: 3/16/2014 4:04:05 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right/Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.314 W/kg

Right/Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.976 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 0.409 W/kg
SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.121 W/kg
Maximum value of SAR (measured) = 0.248 W/kg

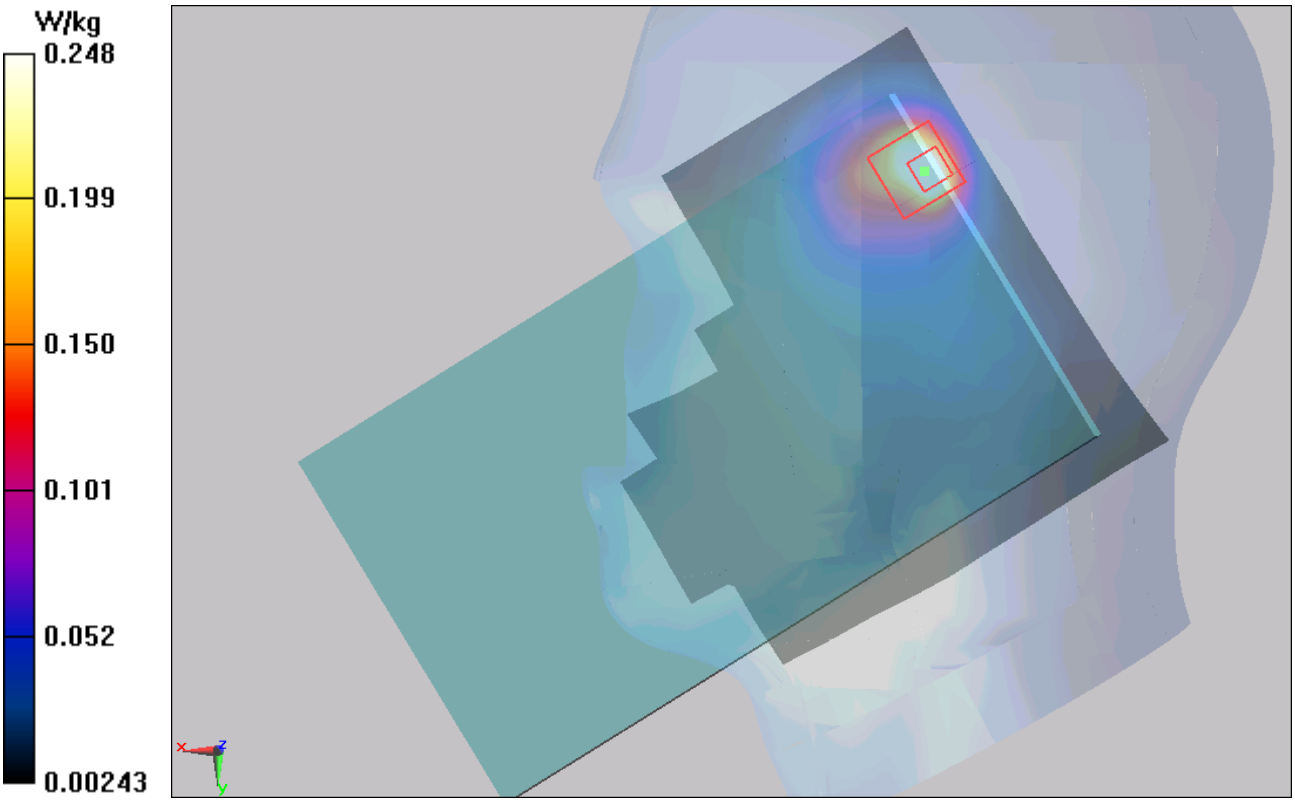


Figure 39 Right Hand Tilt 15° UMTS Band II Channel 9400

UMTS Band II with Test Position 1 High

Date/Time: 3/10/2014 4:04:52 PM
Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.529 S/m; ε_r = 52.625; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High /Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.920 W/kg

Test Position 1 High /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.211 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 0.966 W/kg; SAR(10 g) = 0.448 W/kg
Maximum value of SAR (measured) = 1.08 W/kg

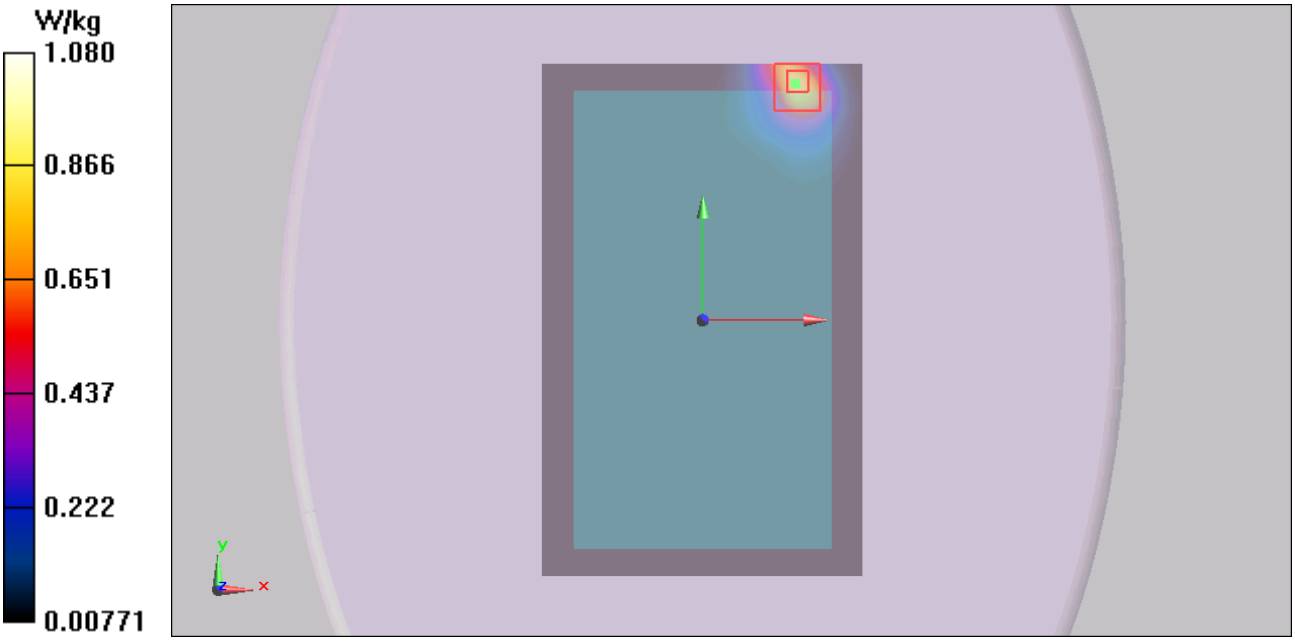


Figure 40 UMTS Band II with Test Position 1 Channel 9538

UMTS Band II with Test Position 1 Middle

Date/Time: 3/10/2014 3:33:32 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle /Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.940 W/kg

Test Position 1 Middle /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 0.984 W/kg; SAR(10 g) = 0.461 W/kg
Maximum value of SAR (measured) = 1.03 W/kg

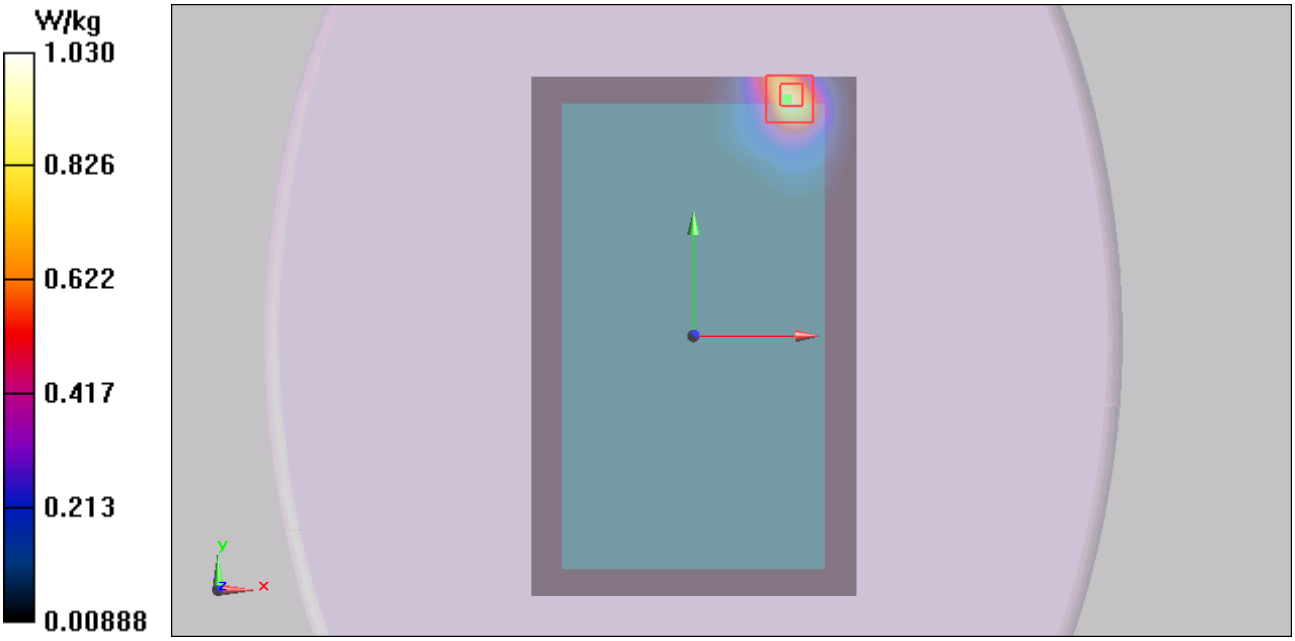


Figure 41 UMTS Band II with Test Position 1 Channel 9400

UMTS Band II with Test Position 1 Low

Date/Time: 3/10/2014 4:37:37 PM
Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.464 S/m; ε_r = 52.752; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low /Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.14 W/kg

Test Position 1 Low /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.794 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 0.970 W/kg; SAR(10 g) = 0.446 W/kg
Maximum value of SAR (measured) = 1.01 W/kg

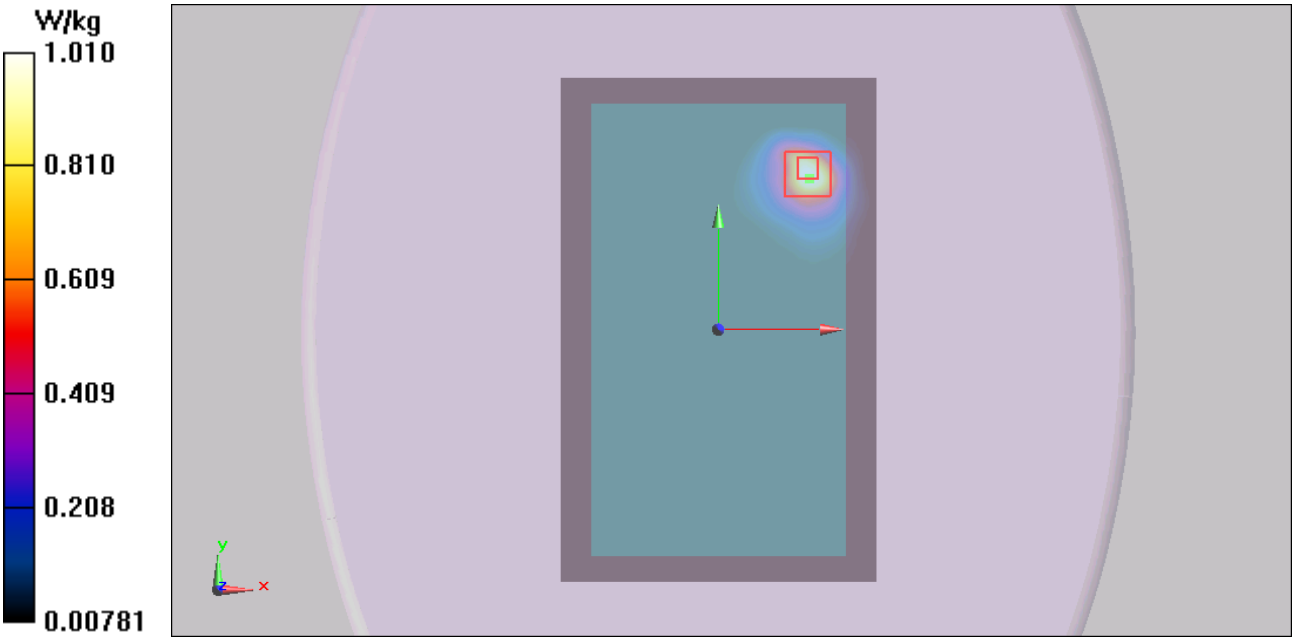


Figure 42 UMTS Band II with Test Position 1 Channel 9262

UMTS Band II with Test Position 3 Middle

Date/Time: 3/10/2014 2:32:03 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 3 Middle /Area Scan (31x101x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.274 W/kg

Test Position 3 Middle /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.782 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.267 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.327 W/kg

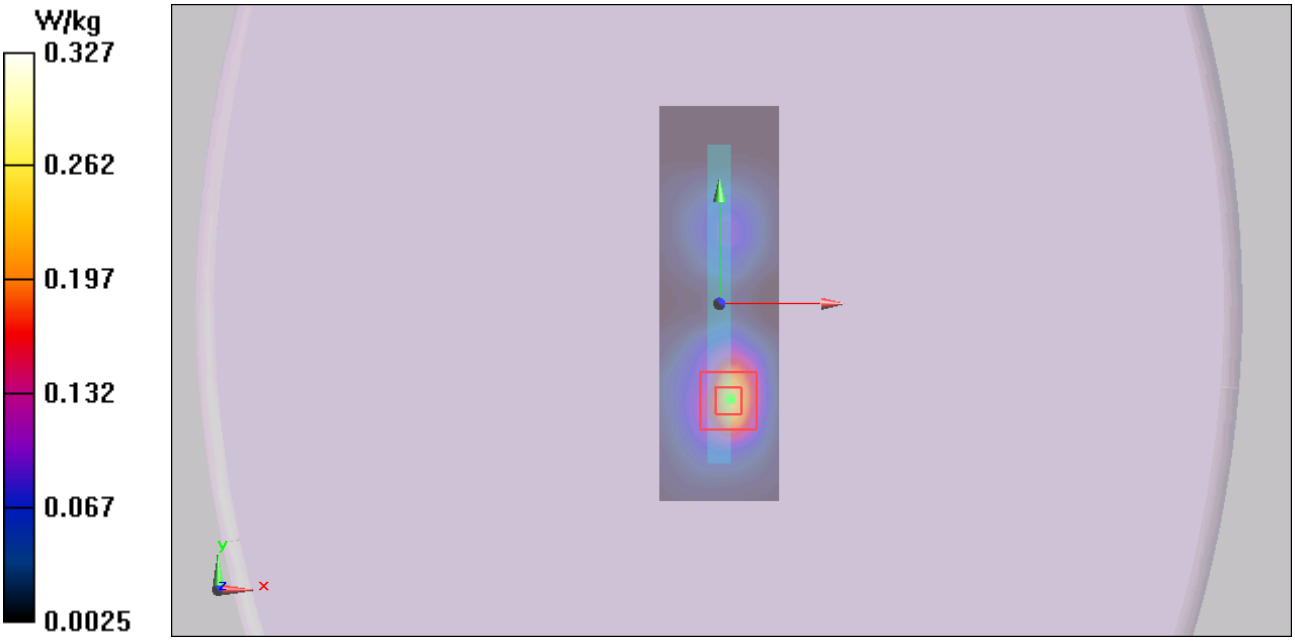


Figure 43 UMTS Band II with Test Position 3 Channel 9400

UMTS Band II with Test Position 5 Middle

Date/Time: 3/10/2014 1:49:00 PM
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 5 Middle /Area Scan (31x161x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.186 W/kg

Test Position 5 Middle /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.088 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.395 W/kg
SAR(1 g) = 0.190 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.226 W/kg

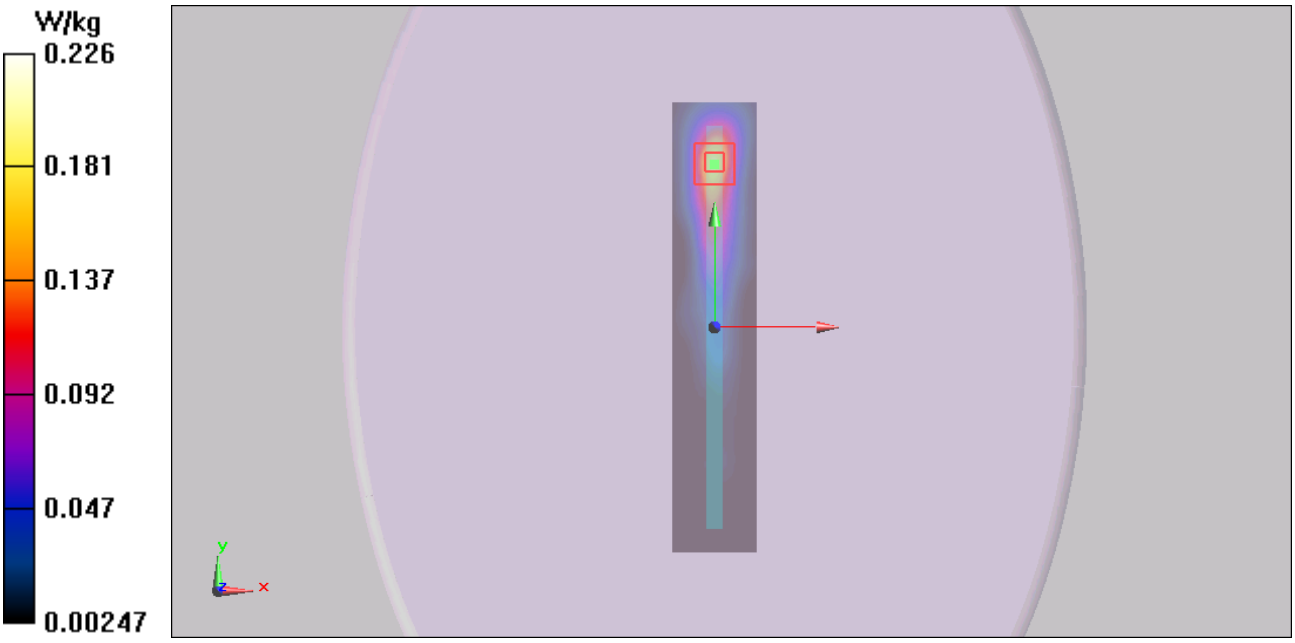


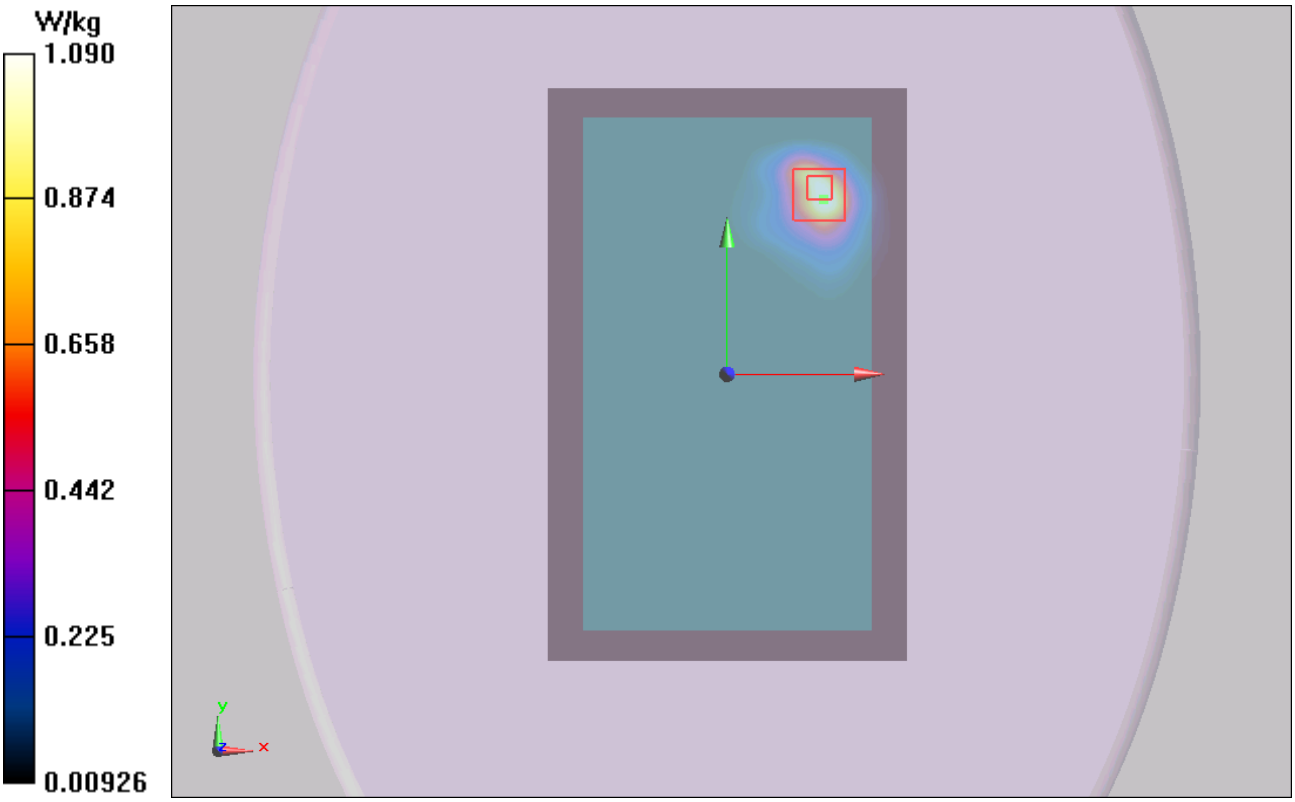
Figure 44 UMTS Band II with Test Position 5 Channel 9400

UMTS Band II with Test Position 1 High (Earphone)

Date/Time: 3/10/2014 7:52:52 PM
Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.529 S/m; ε_r = 52.625; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Test Position 1 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.952 V/m; Power Drift = 0.090 dB
Peak SAR (extrapolated) = 2.42 W/kg
SAR(1 g) = 1.040 W/kg; SAR(10 g) = 0.477 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



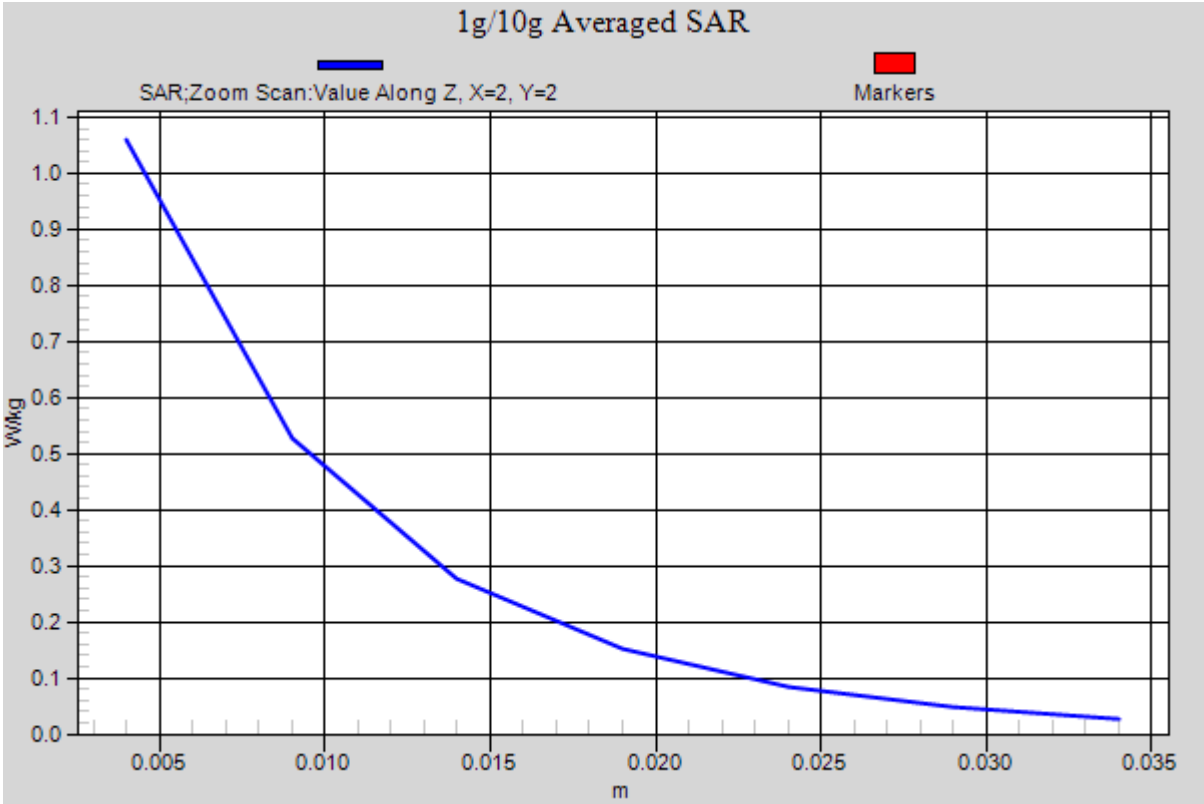


Figure 45 UMTS Band II with Test Position 1 Channel 9538

UMTS Band II with Test Position 1 Middle(1st Repeated SAR)

Date/Time: 3/10/2014 8:36:44 PM

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1880 MHz; σ = 1.493 S/m; ε_r = 52.676; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.26 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.618 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 1.050 W/kg; SAR(10 g) = 0.485 W/kg

Maximum value of SAR (measured) = 1.18 W/kg

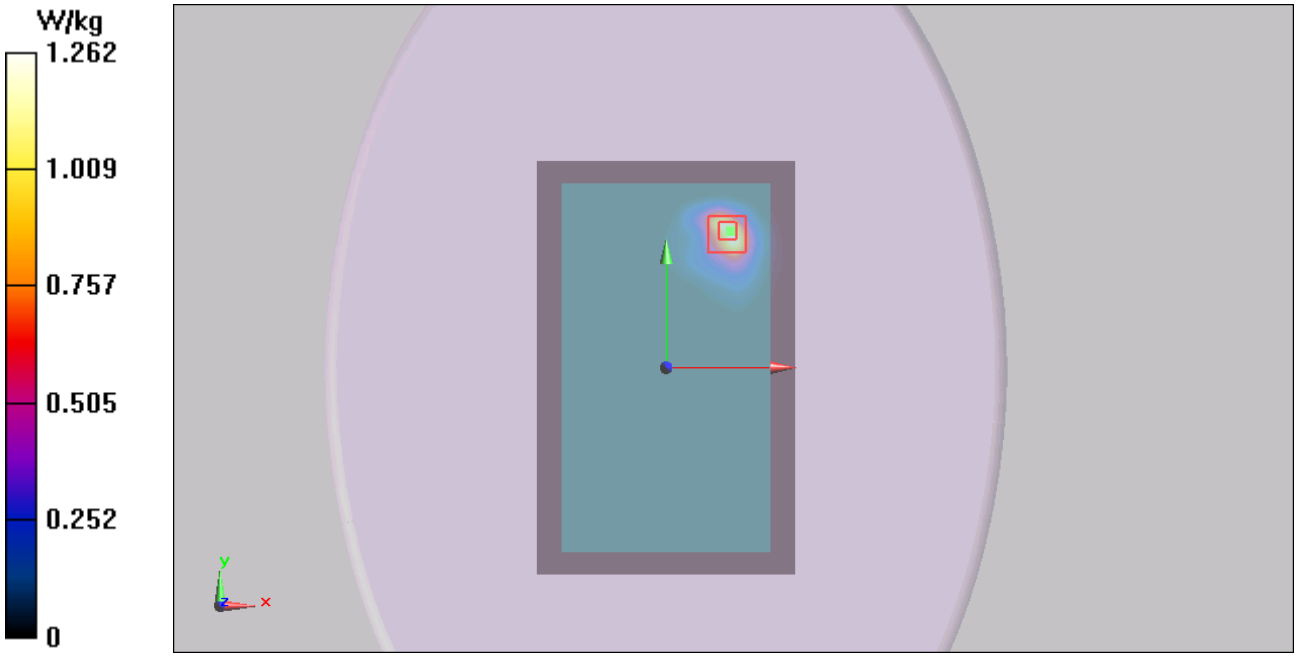


Figure 46 UMTS Band II with Test Position 1 Channel 9400

UMTS Band V Left Cheek Middle

Date/Time: 3/20/2014 1:11:00 AM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.187 W/kg

Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.927 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.249 W/kg
SAR(1 g) = 0.174 W/kg; SAR(10 g) = 0.118 W/kg
Maximum value of SAR (measured) = 0.185 W/kg

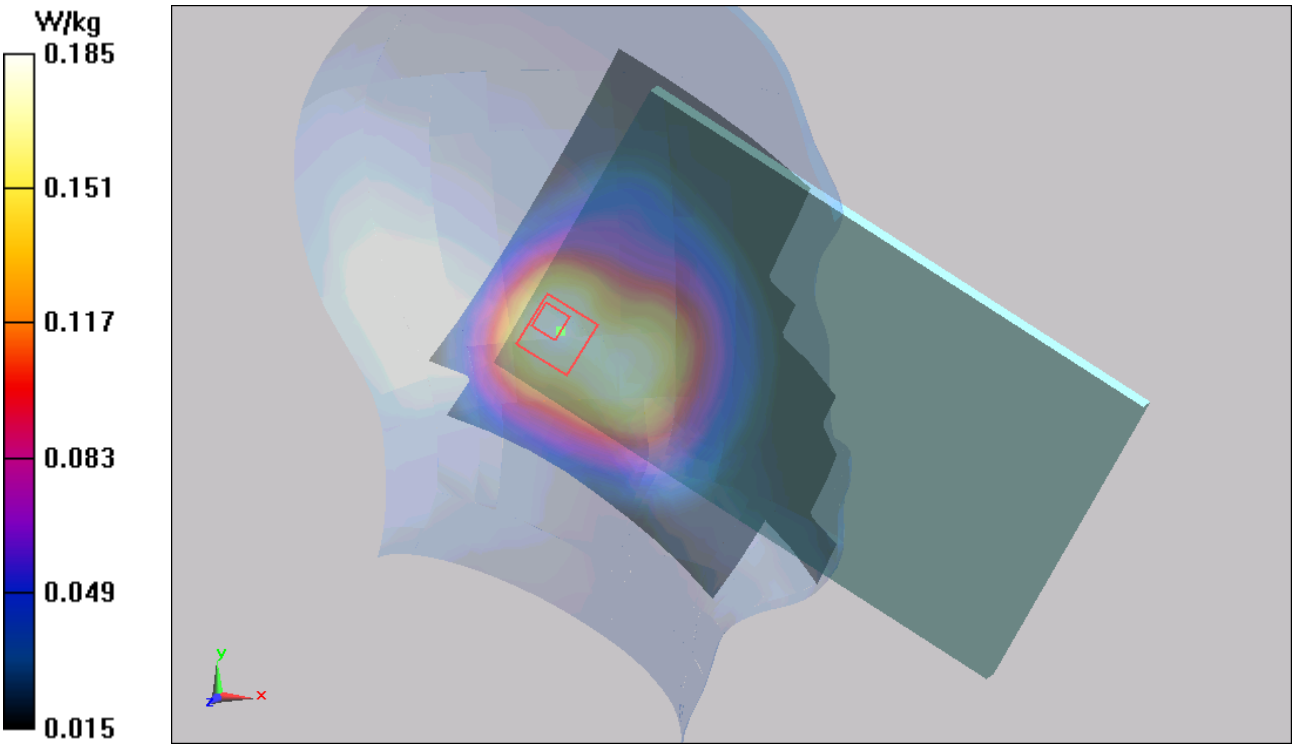


Figure 47 Left Hand Touch Cheek UMTS Band V Channel 4183

UMTS Band V Left Tilt Middle

Date/Time: 3/20/2014 1:48:13 AM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Tilt Middle/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.168 W/kg

Left Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.942 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.111 W/kg
Maximum value of SAR (measured) = 0.173 W/kg

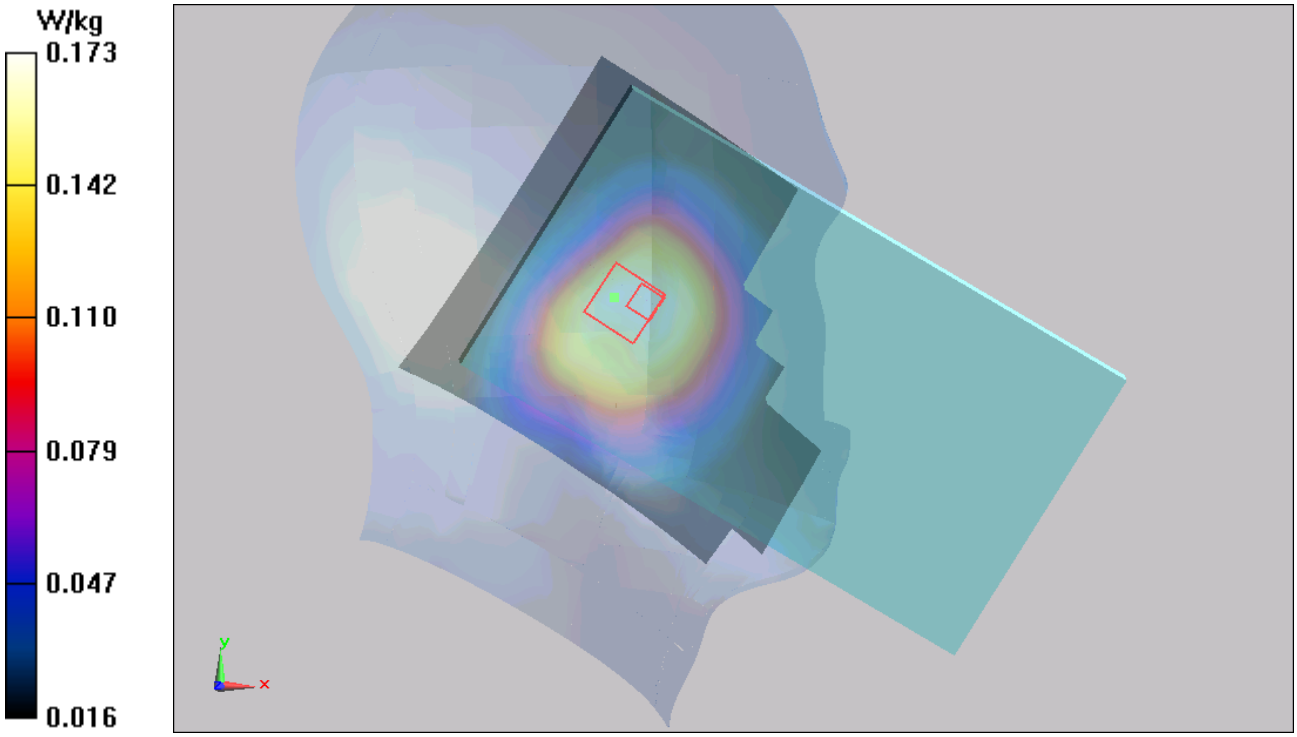


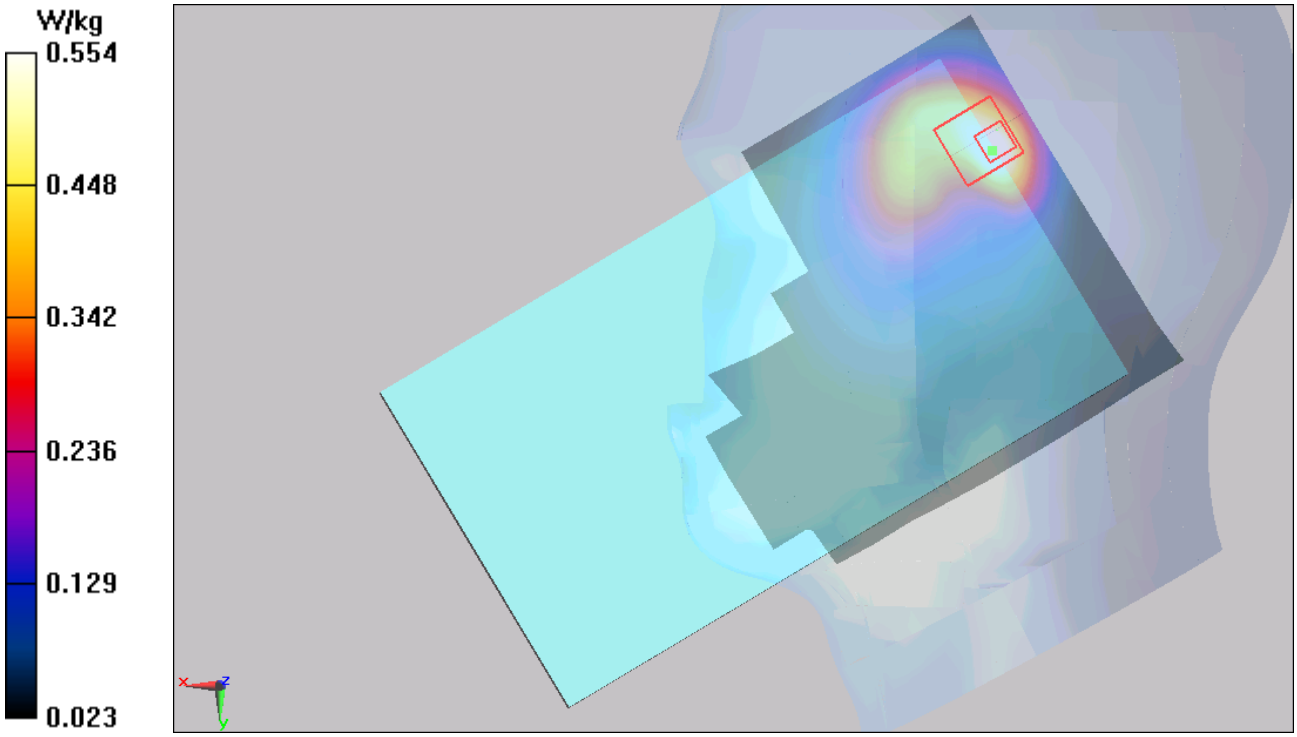
Figure 48 Left Hand Tilt 15° UMTS Band V Channel 4183

UMTS Band V Right Cheek Middle

Date/Time: 3/20/2014 1:28:42 AM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Cheek Middle/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.650 W/kg

Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.820 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.844 W/kg
SAR(1 g) = 0.503 W/kg; SAR(10 g) = 0.300 W/kg
Maximum value of SAR (measured) = 0.554 W/kg



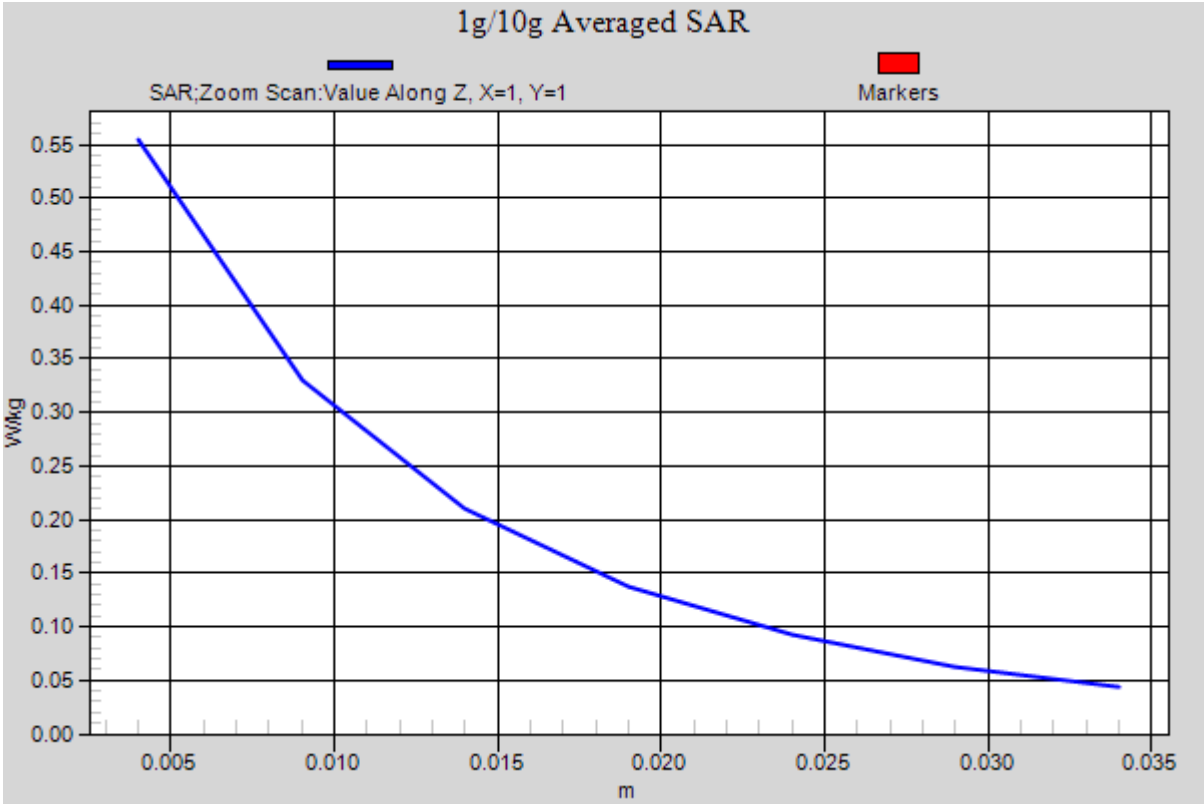


Figure 49 Right Hand Touch Cheek UMTS Band V Channel 4183

UMTS Band V Right Tilt Middle

Date/Time: 3/20/2014 2:17:38 AM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Tilt Middle/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.553 W/kg

Right Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.979 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.867 W/kg
SAR(1 g) = 0.482 W/kg; SAR(10 g) = 0.266 W/kg
Maximum value of SAR (measured) = 0.582 W/kg

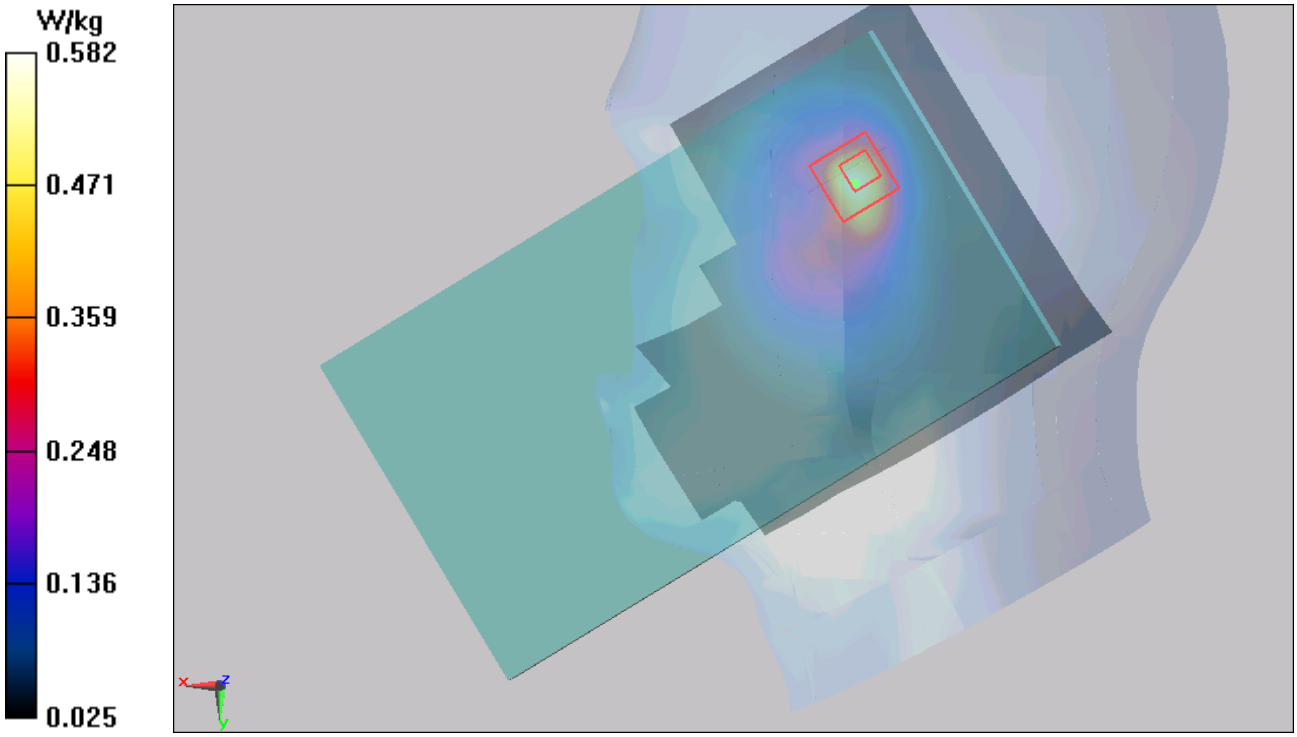


Figure 50 Right Hand Tilt 15° UMTS Band V Channel 4183

UMTS Band V with Test Position 1 High

Date/Time: 3/20/2014 4:28:09 PM
Communication System: WCDMA; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 1.004 S/m; ε_r = 55.772; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 W/kg

Test Position 1 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.813 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 3.24 W/kg
SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.464 W/kg
Maximum value of SAR (measured) = 1.11 W/kg

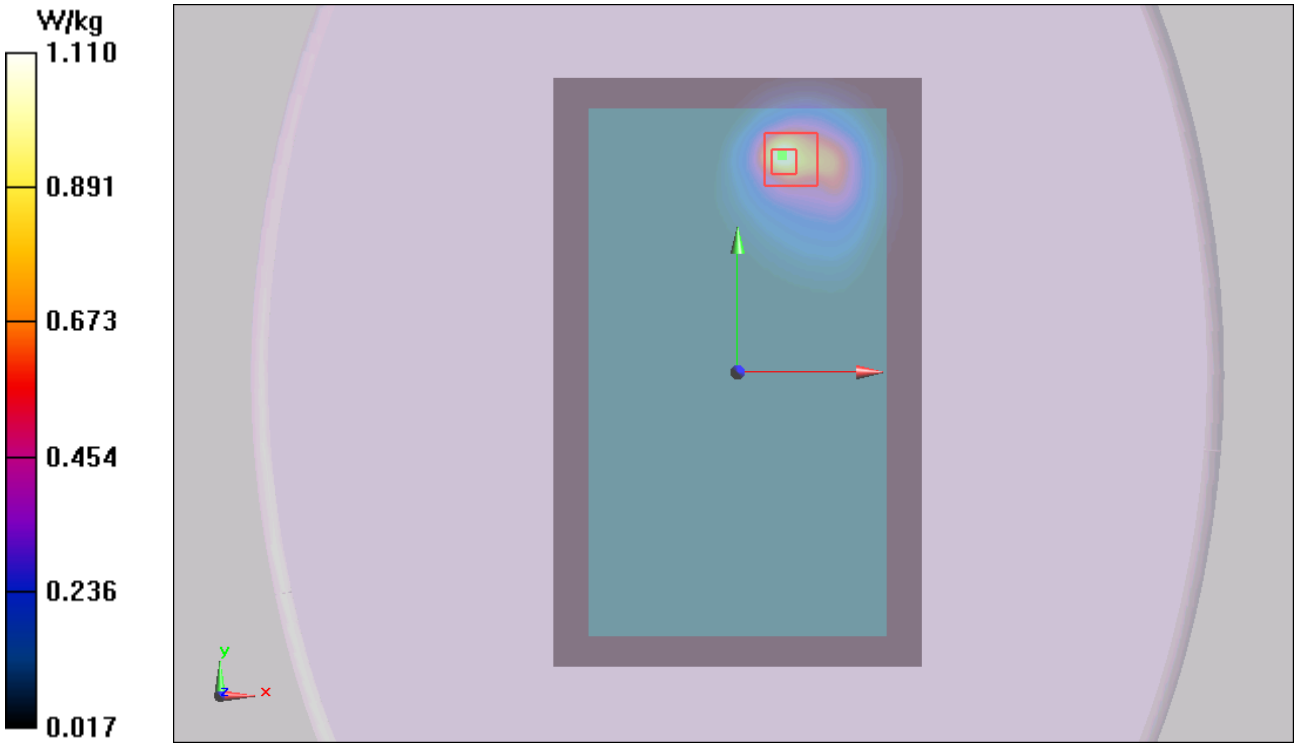


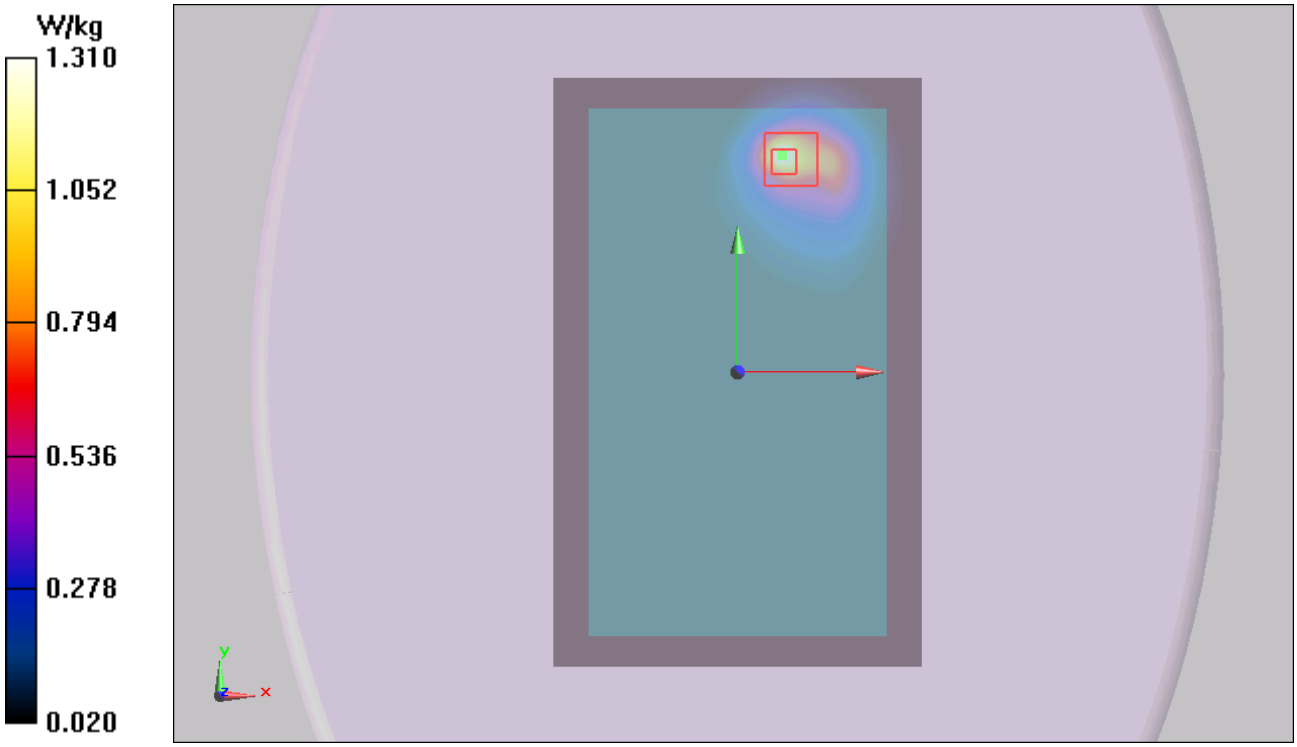
Figure 51 UMTS Band V with Test Position 1 Channel 4233

UMTS Band V with Test Position 1 Middle

Date/Time: 3/20/2014 4:46:11 PM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.22 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.030 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.512 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



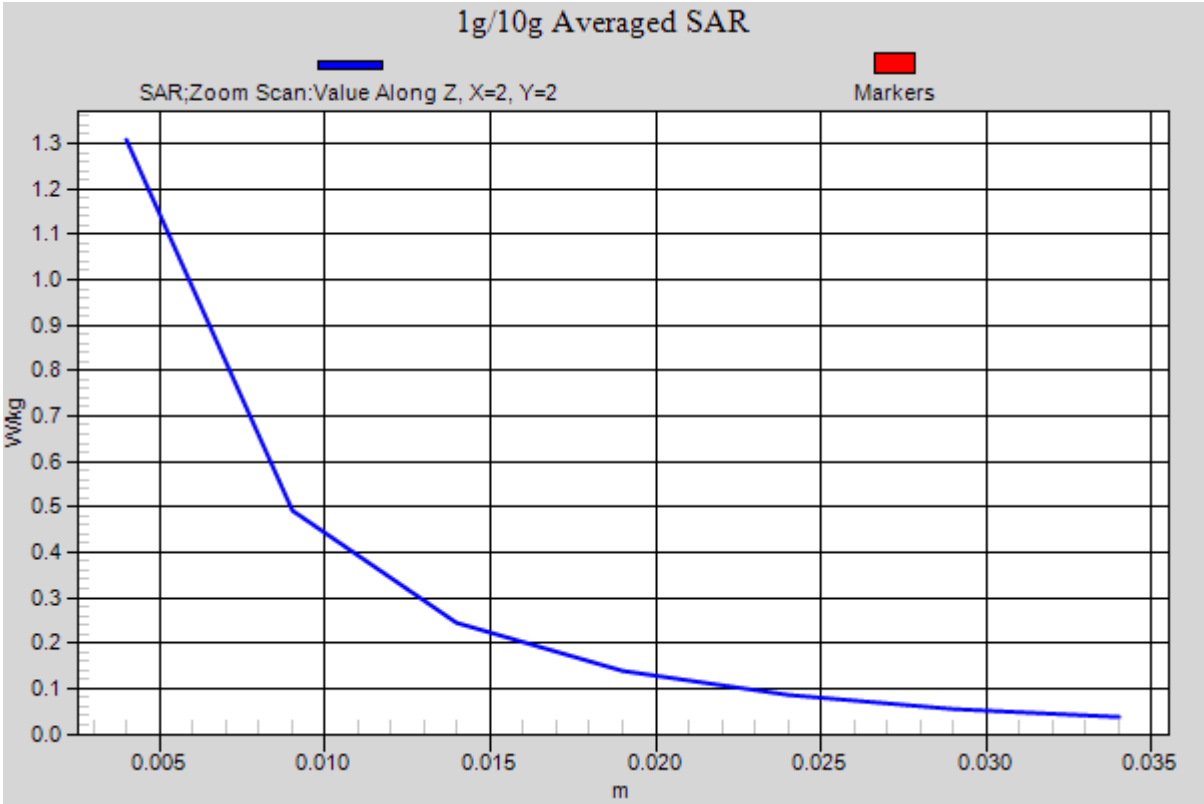


Figure 52 UMTS Band V with Test Position 1 Channel 4183

UMTS Band V with Test Position 1 Low

Date/Time: 3/20/2014 4:01:02 PM

Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.98 S/m; ε_r = 55.933; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (91x161x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.975 W/kg

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.900 V/m; Power Drift = 0.035 dB

Peak SAR (extrapolated) = 2.85 W/kg

SAR(1 g) = 0.940 W/kg; SAR(10 g) = 0.446 W/kg

Maximum value of SAR (measured) = 1.10 W/kg

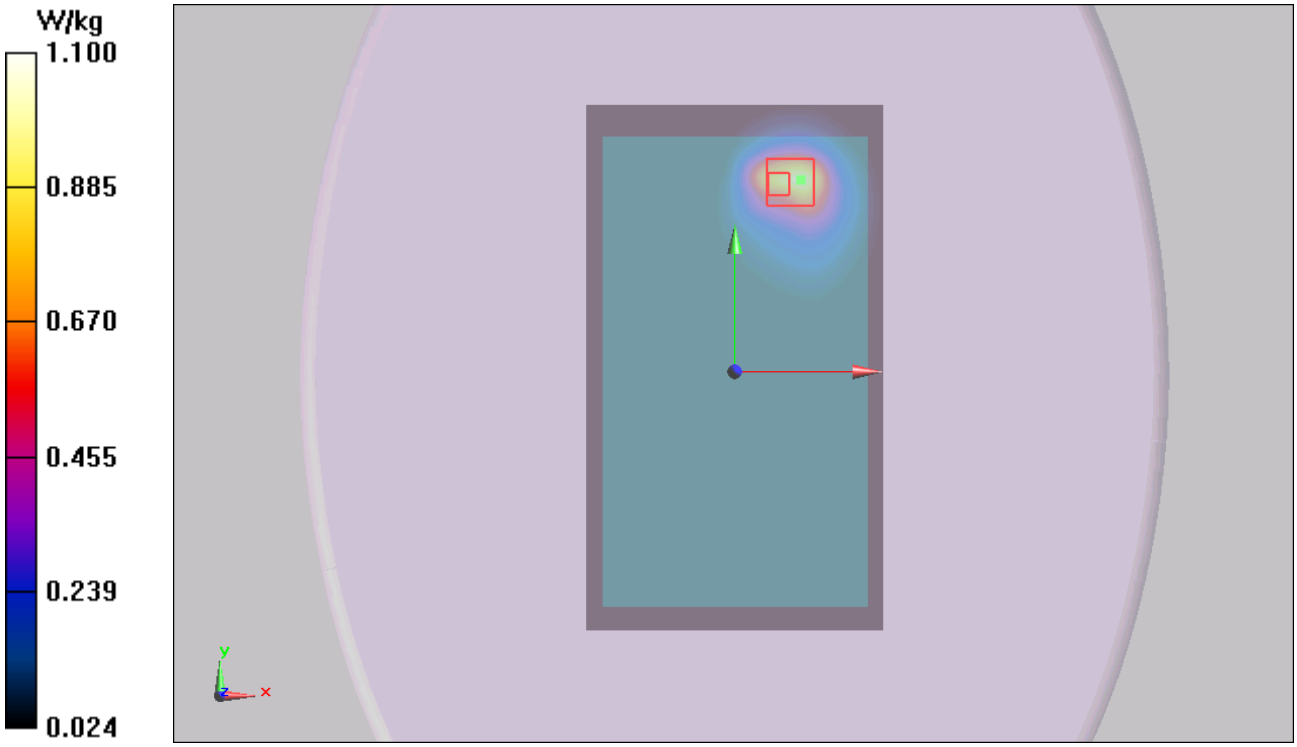


Figure 53 UMTS Band V with Test Position 1 Channel 4132

UMTS Band V with Test Position 3 Middle

Date/Time: 3/20/2014 5:05:42 PM

Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 3 Middle/Area Scan (31x91x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.297 W/kg

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.503 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.498 W/kg

SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.182 W/kg

Maximum value of SAR (measured) = 0.299 W/kg

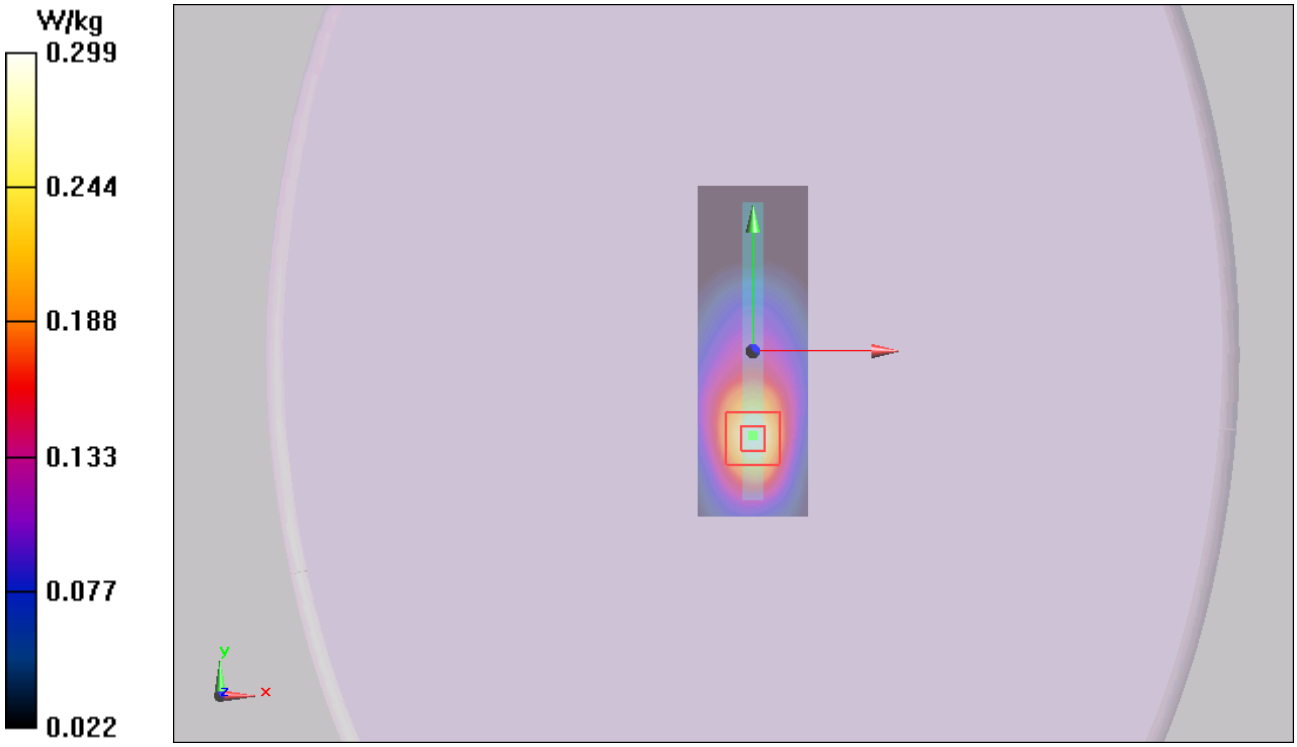


Figure 54 UMTS Band V with Test Position 3 Channel 4183

UMTS Band V with Test Position 5 Middle

Date/Time: 3/20/2014 5:47:19 PM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 5 Middle/Area Scan (31x161x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.289 W/kg

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.225 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.454 W/kg
SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.153 W/kg
Maximum value of SAR (measured) = 0.260 W/kg

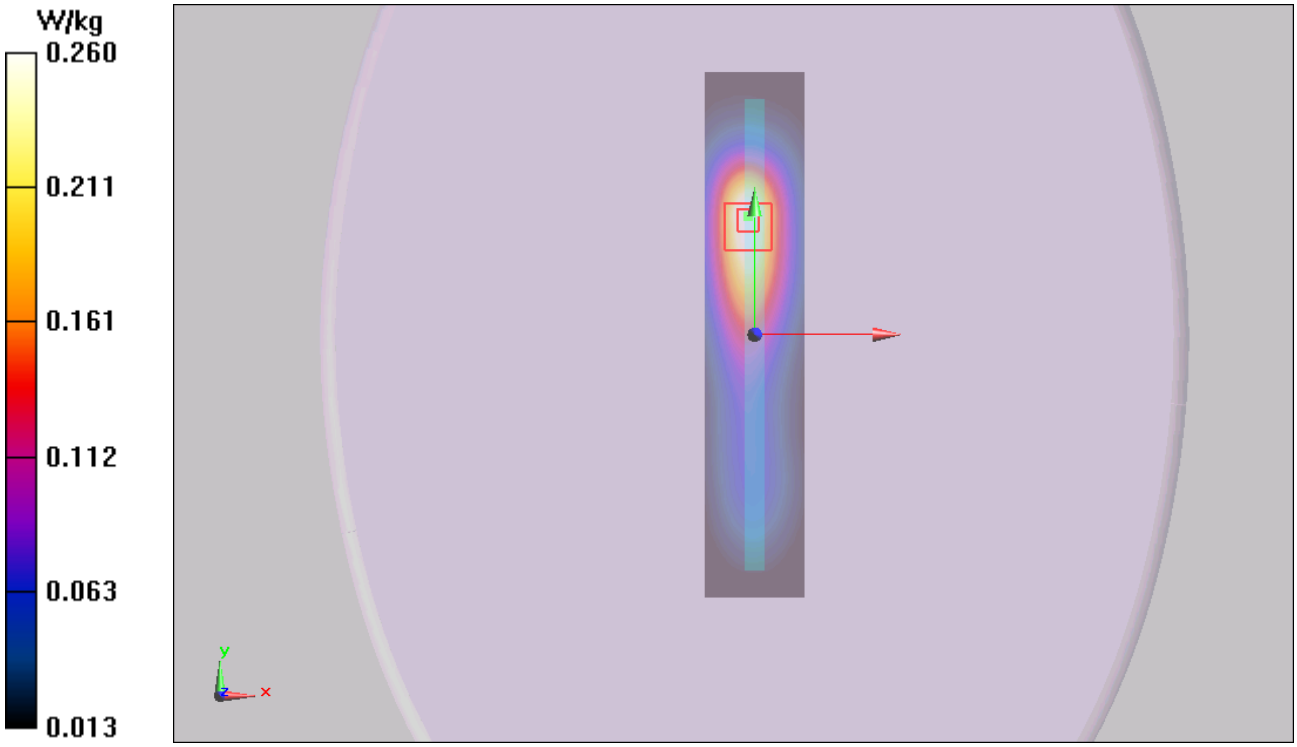


Figure 55 UMTS Band V with Test Position 5 Channel 4183

UMTS Band V with Earphone Test Position 1 Middle

Date/Time: 3/20/2014 6:21:34 PM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.18 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.529 V/m; Power Drift = 0.195 dB
Peak SAR (extrapolated) = 3.20 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.466 W/kg
Maximum value of SAR (measured) = 1.12 W/kg

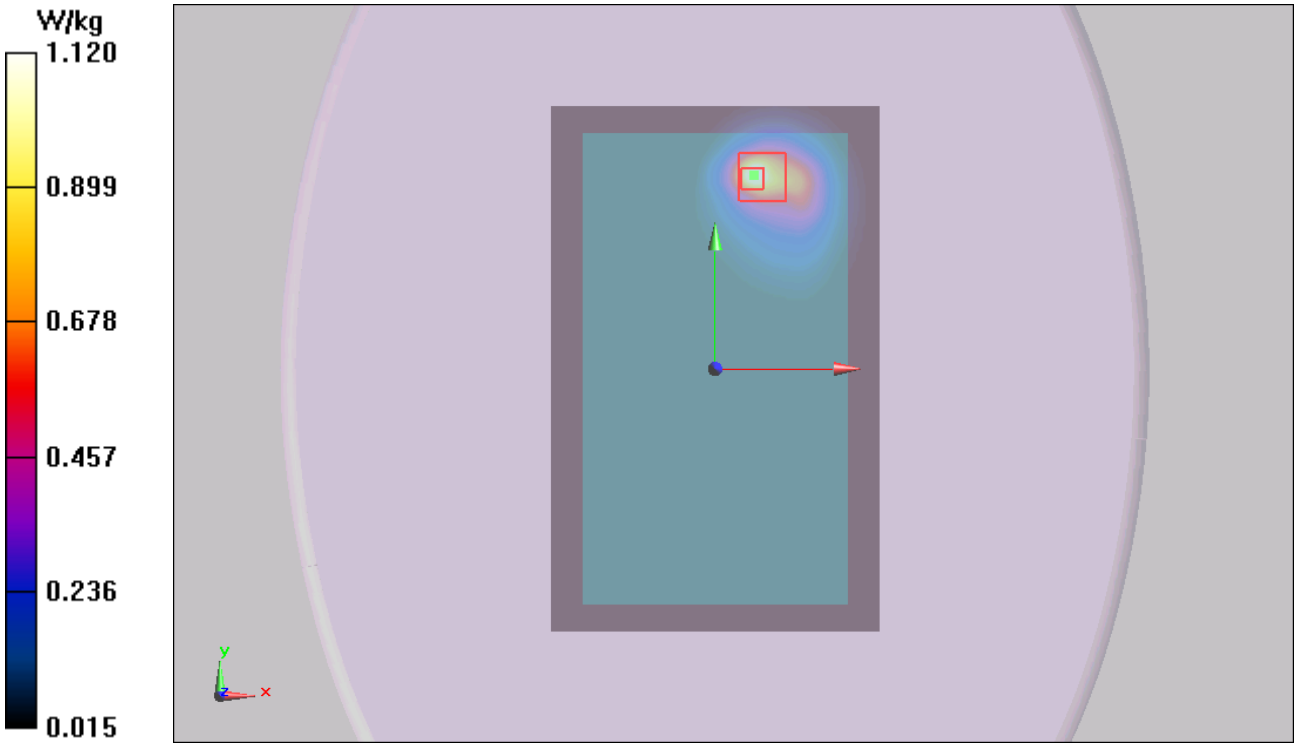


Figure 56 UMTS Band V with Earphone, Test Position 1 Channel 4183

UMTS Band V with Test Position 1 Middle (1st Repeated SAR)

Date/Time: 3/20/2014 6:53:07 PM
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.16 W/kg

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.917 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.468 W/kg
Maximum value of SAR (measured) = 1.10 W/kg

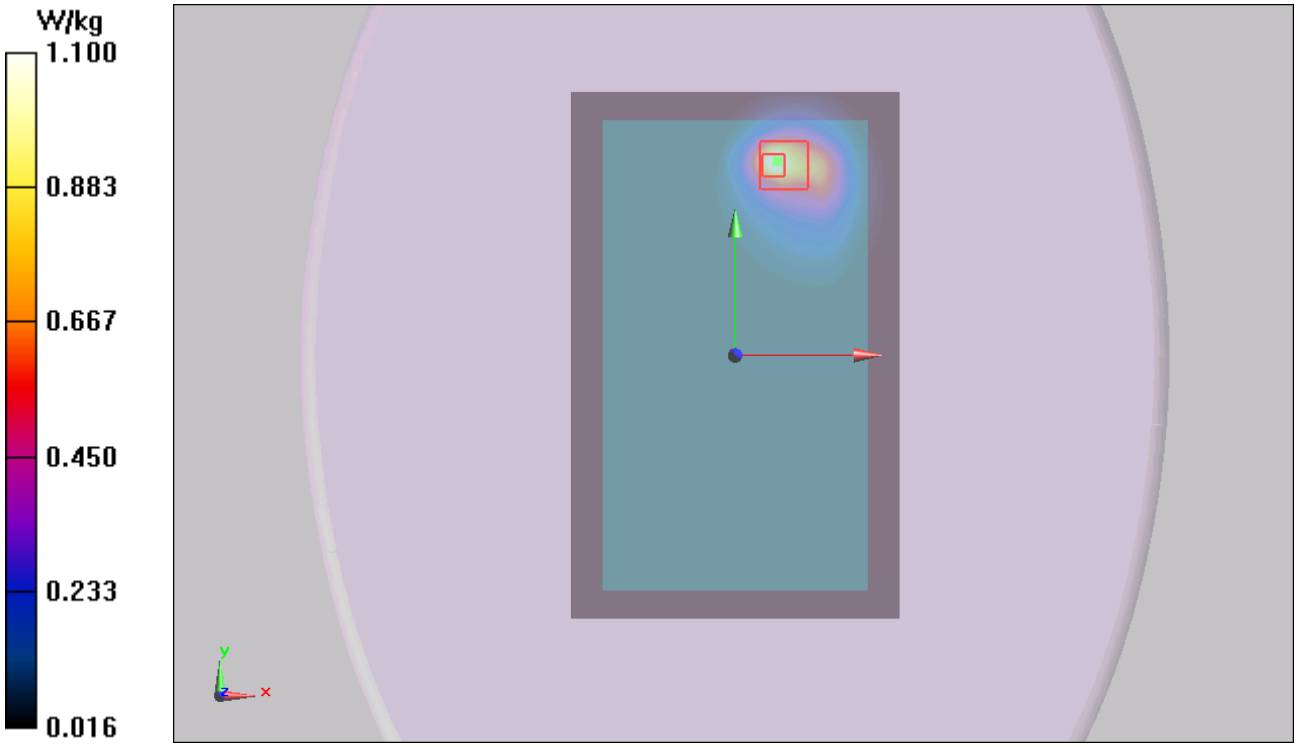


Figure 57 UMTS Band V with Test Position 1 Channel 4183

802.11b Left Cheek Middle

Date/Time: 3/20/2014 6:13:36 AM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.199; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.00601 W/kg

Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.686 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 0.00469 W/kg
SAR(1 g) = 0.00274 W/kg; SAR(10 g) = 0.00132 W/kg
Maximum value of SAR (measured) = 0.00309 W/kg

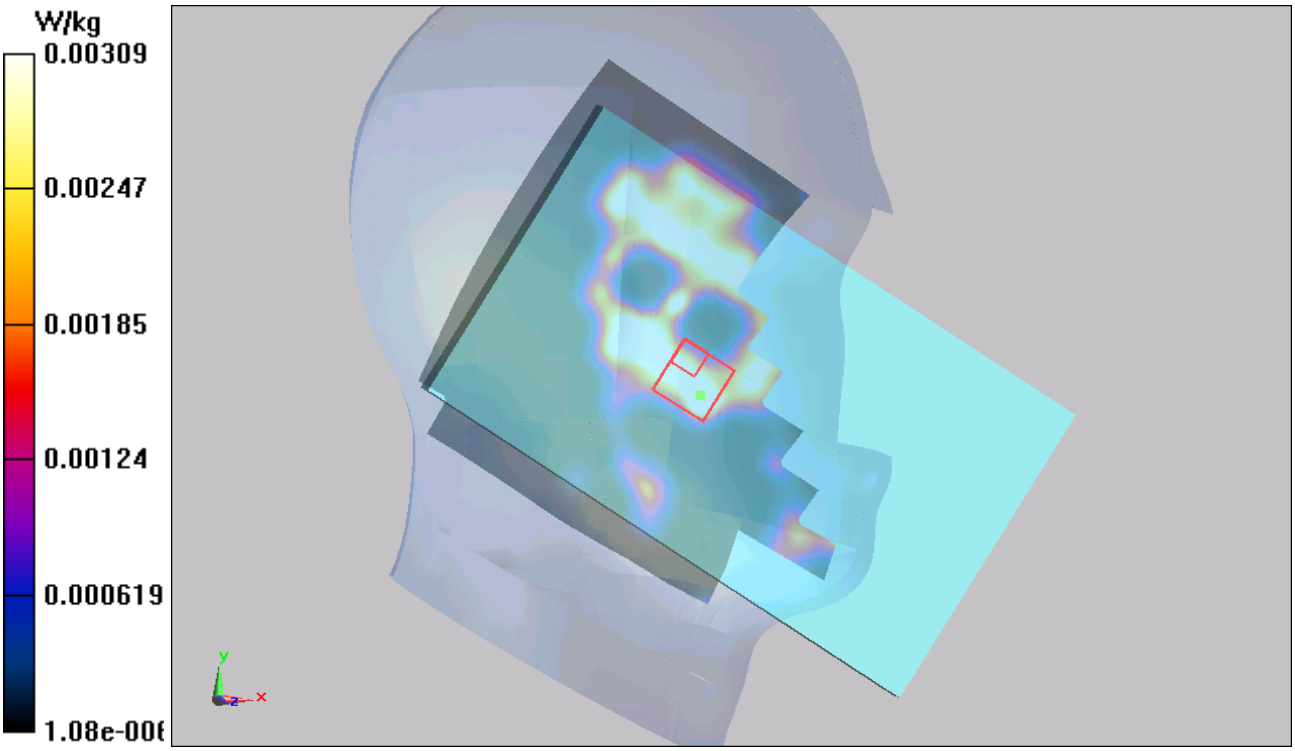


Figure 58 Left Hand Touch Cheek 802.11b Channel 6

802.11b Left Tilt Middle

Date/Time: 3/20/2014 6:33:14 AM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.199; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.00882 W/kg

Left Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.089 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.0160 W/kg
SAR(1 g) = 0.0036 W/kg; SAR(10 g) = 0.00158 W/kg
Maximum value of SAR (measured) = 0.00365 W/kg

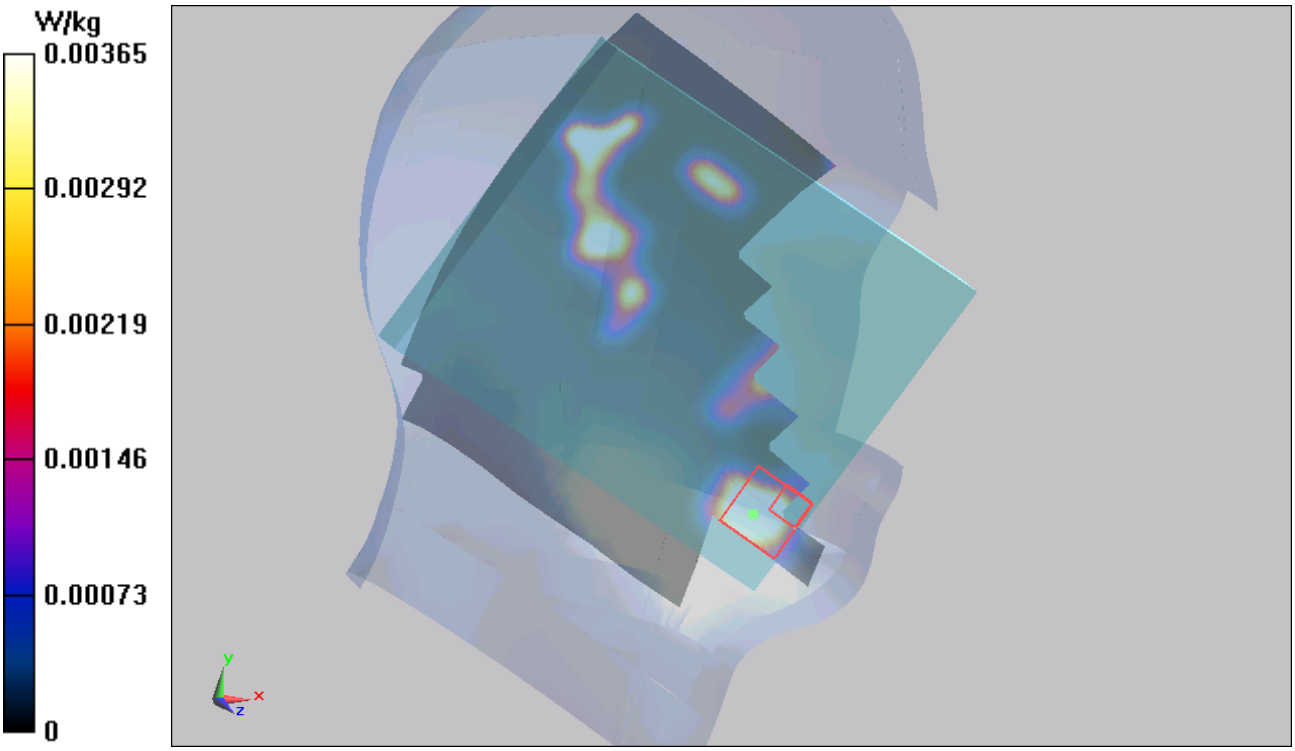


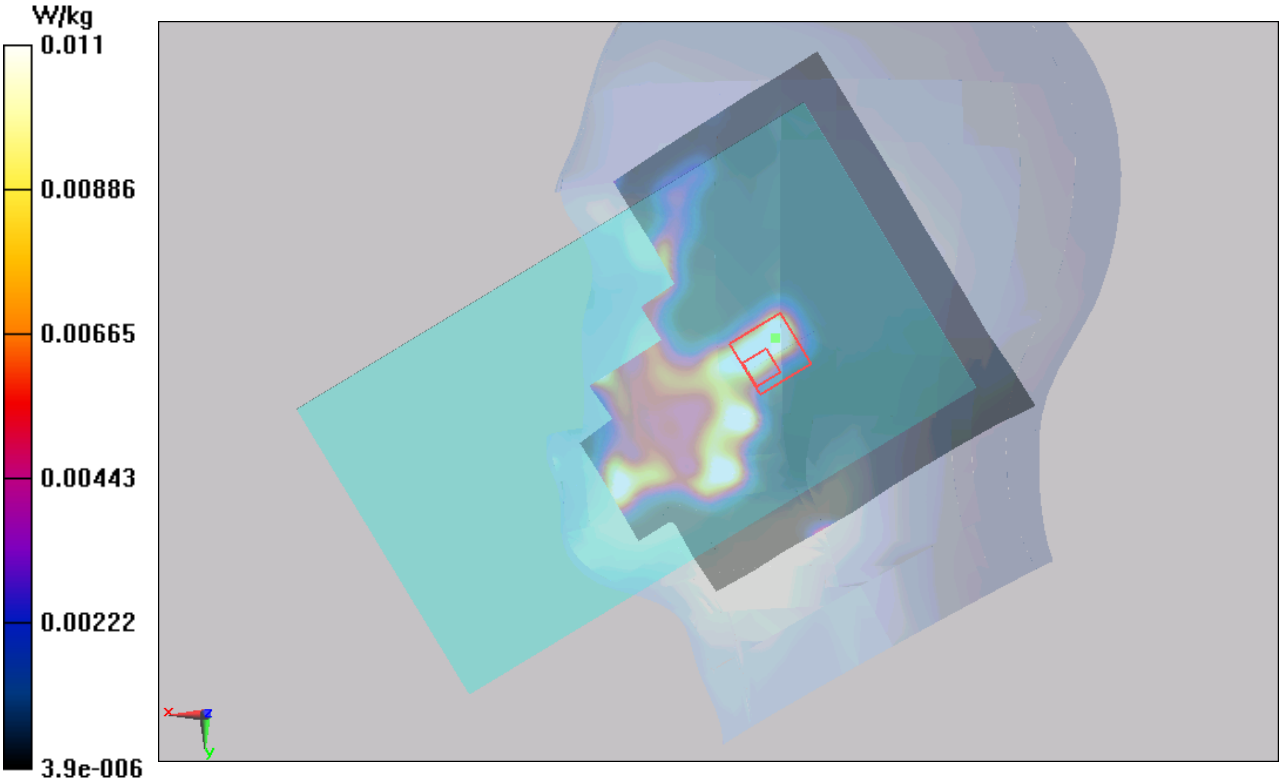
Figure 59 Left Hand Tilt 15° 802.11b Channel 6

802.11b Right Cheek Middle

Date/Time: 3/20/2014 6:58:11 AM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.199; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Cheek Middle/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.0166 W/kg

Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.493 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 0.0220 W/kg
SAR(1 g) = 0.00583 W/kg; SAR(10 g) = 0.00166 W/kg
Maximum value of SAR (measured) = 0.011 W/kg



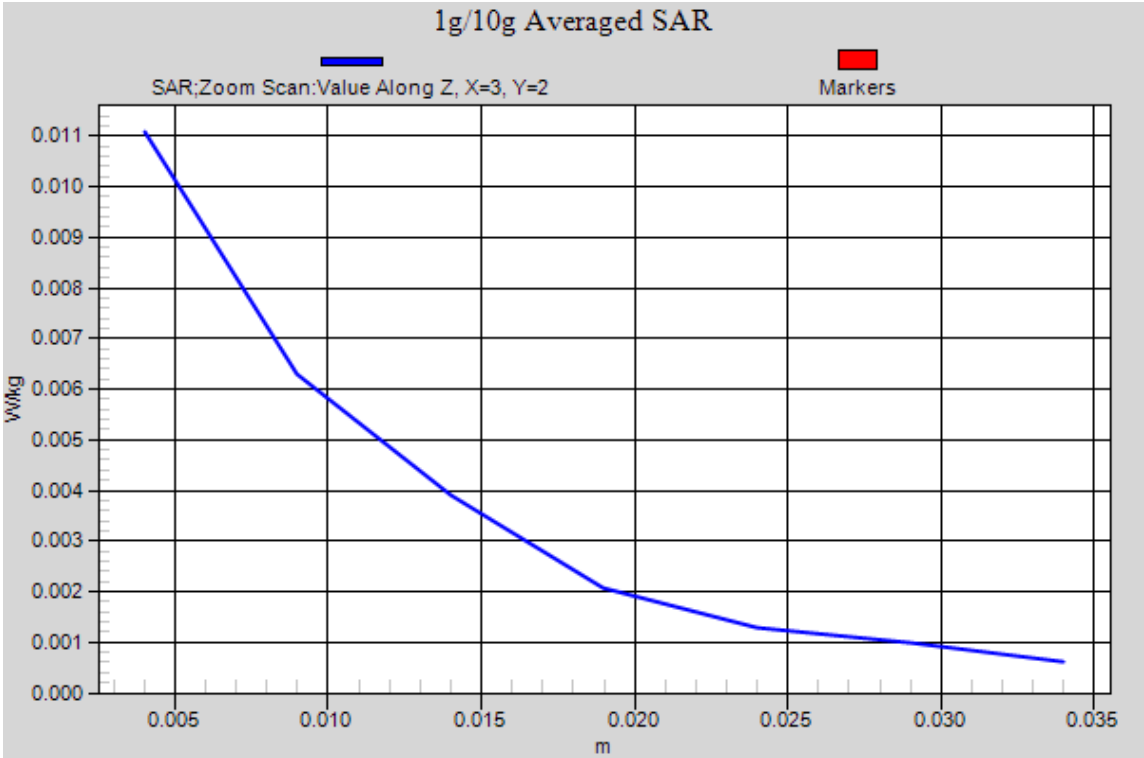


Figure 60 Right Hand Touch Cheek 802.11b Channel 6

802.11b Right Tilt Middle

Date/Time: 3/20/2014 5:48:45 AM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.199; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Tilt Middle/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.00431 W/kg

Right Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.656 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.00683 W/kg
SAR(1 g) = 0.00249 W/kg; SAR(10 g) = 0.00002 W/kg
Maximum value of SAR (measured) = 0.00339 W/kg

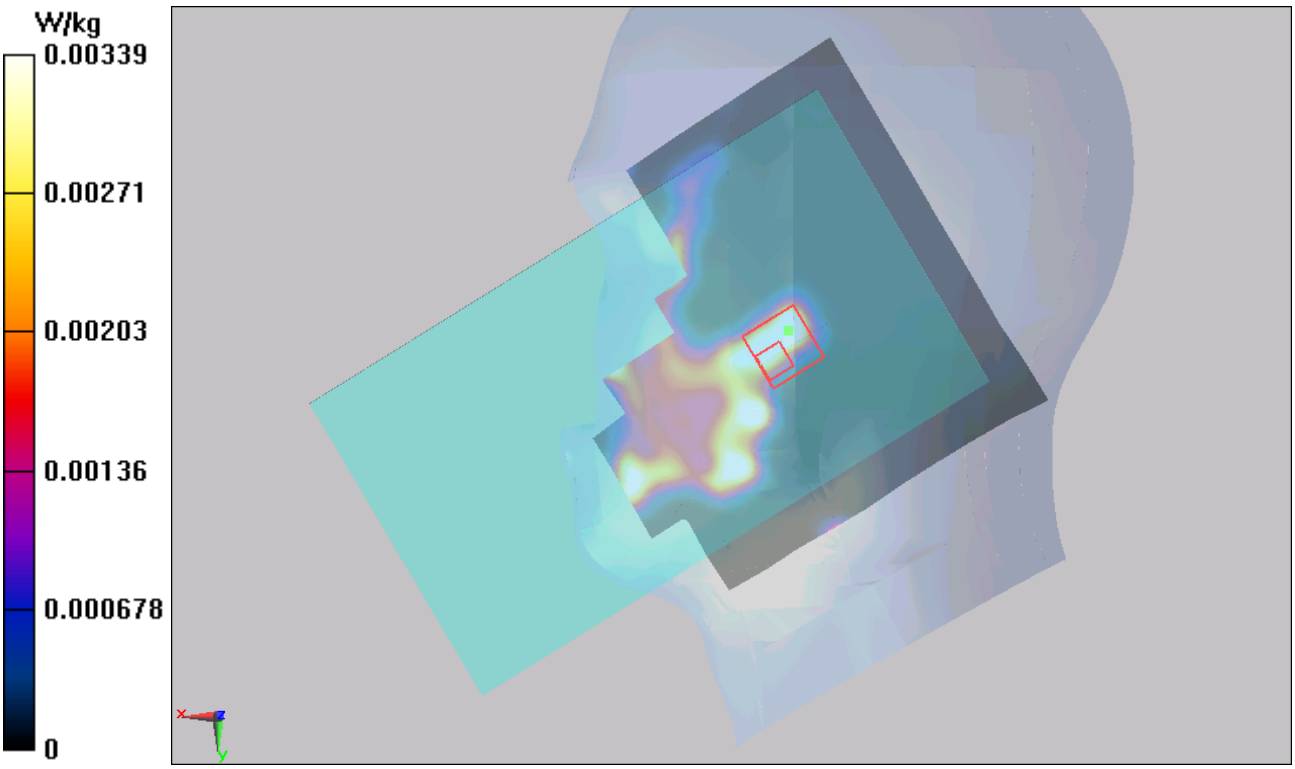


Figure 61 Right Hand Tilt 15° 802.11b Channel 6

802.11b Test Position 1 High

Date/Time: 3/19/2014 2:26:34 PM

Communication System: 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2462 MHz; σ = 2.009 S/m; ε_r = 52.109; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 High/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.631 W/kg

Test Position 1 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.717 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.644 W/kg; SAR(10 g) = 0.247 W/kg

Maximum value of SAR (measured) = 0.810 W/kg

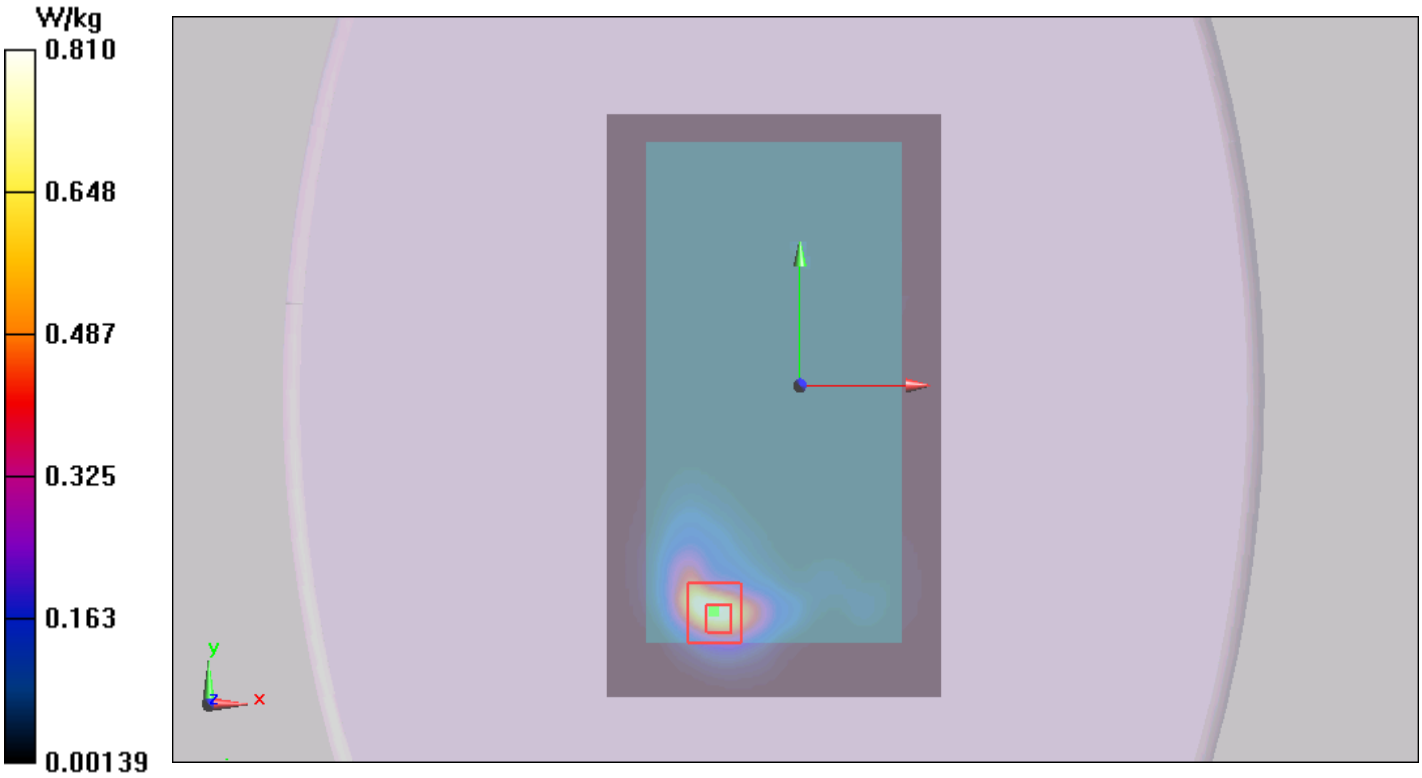


Figure 62 802.11b Test Position 1 Channel 11

802.11b Test Position 1 Middle

Date/Time: 3/19/2014 1:33:10 PM

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.977 S/m; ε_r = 52.177; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Middle/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.711 W/kg

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.557 V/m; Power Drift = 0.062 dB

Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 0.763 W/kg; SAR(10 g) = 0.295 W/kg

Maximum value of SAR (measured) = 0.824 W/kg

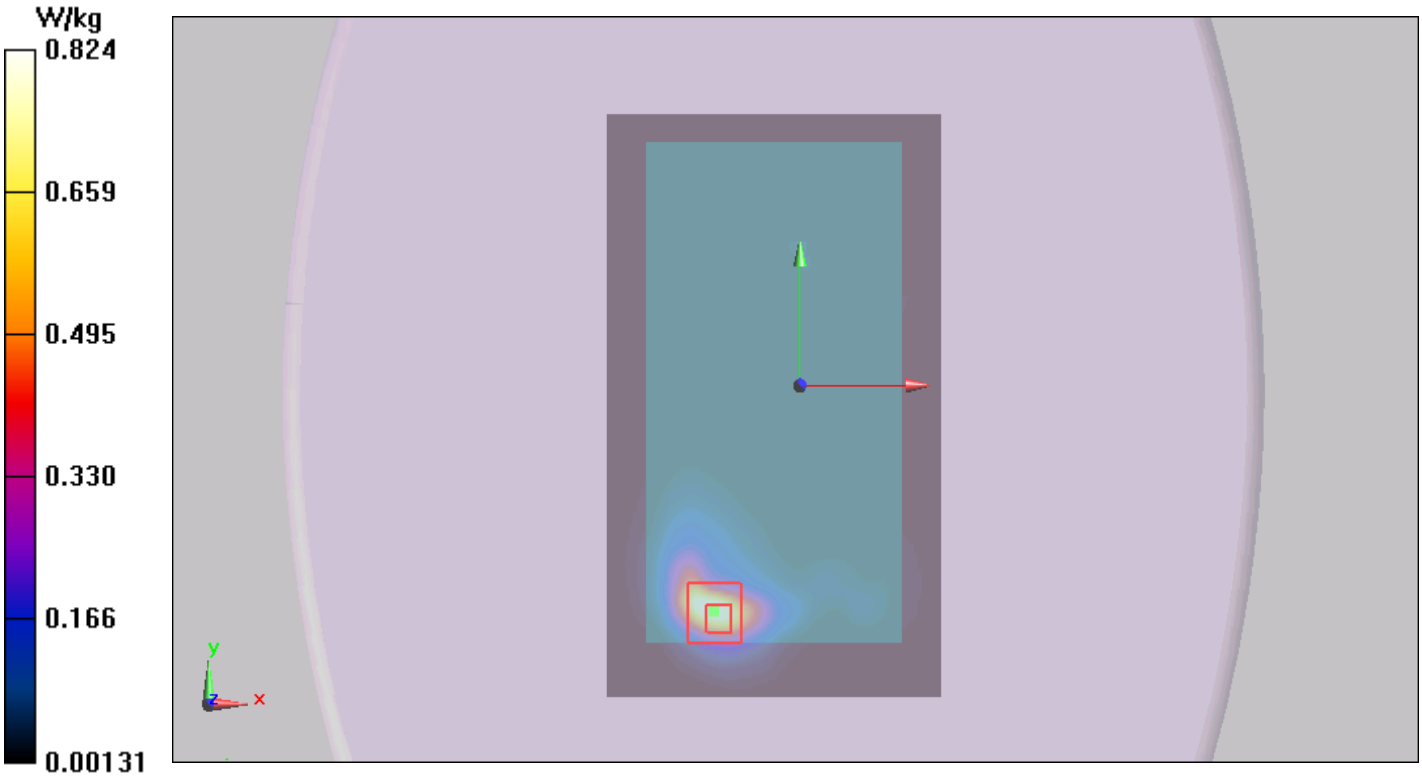


Figure 63 802.11b Test Position 1 Channel 6

802.11b Test Position 1 Low

Date/Time: 3/19/2014 1:59:46 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.945 S/m; ε_r = 52.239; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 1.12 W/kg

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.091dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 0.924 W/kg; SAR(10 g) = 0.359 W/kg

Maximum value of SAR (measured) = 1.01 W/kg

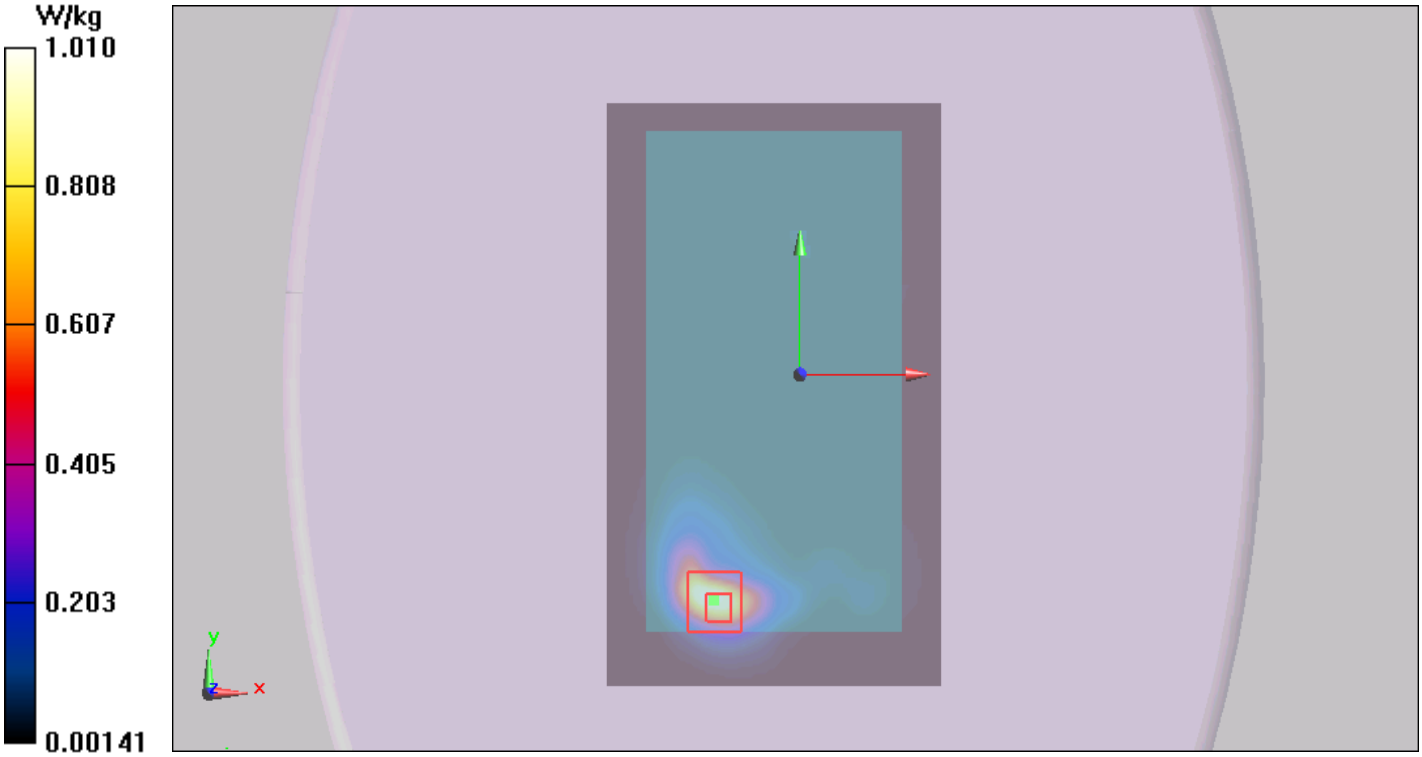


Figure 64 802.11b Test Position 1 Channel 1

802.11b Test Position 2 Middle

Date/Time: 3/19/2014 3:17:25 PM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.977 S/m; ε_r = 52.177; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 2 Middle/Area Scan (31x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.513 W/kg

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.530 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.434 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.498 W/kg

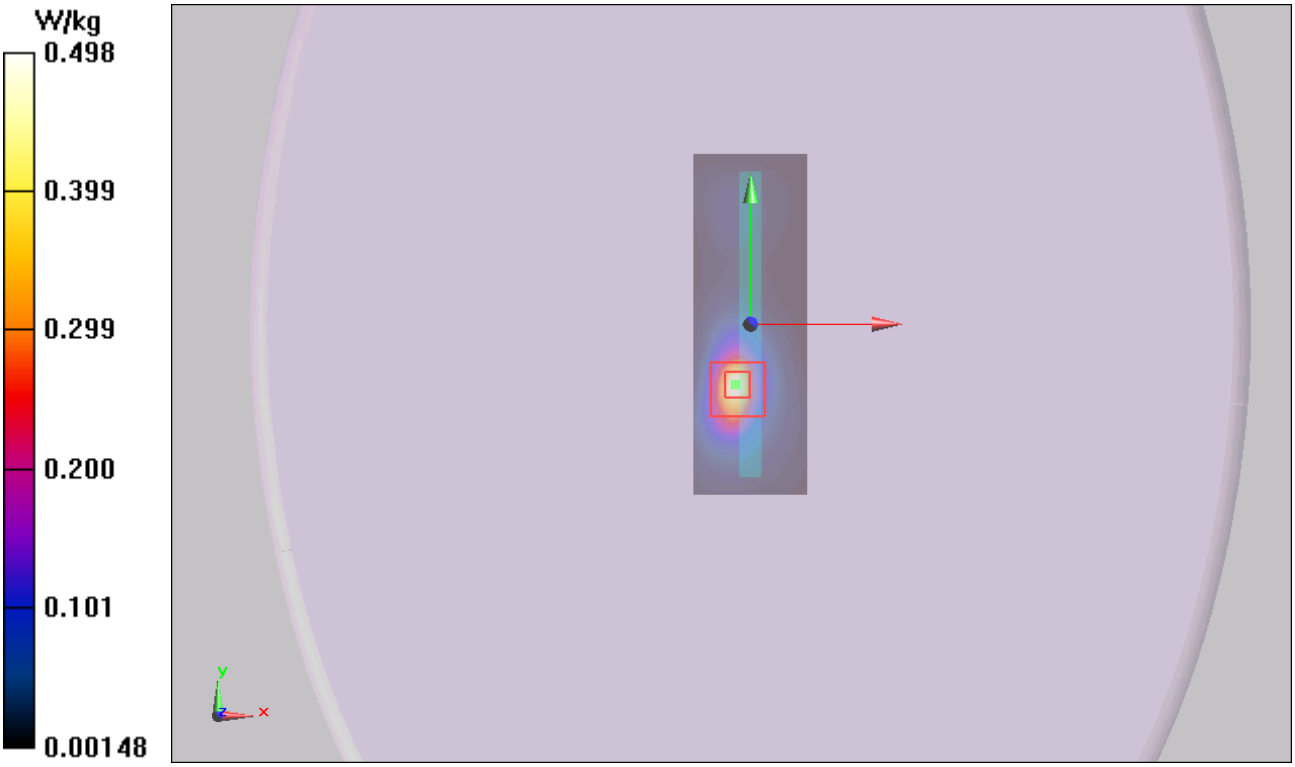


Figure 65 802.11b Test Position 2 Channel 6

802.11b Test Position 4 Middle

Date/Time: 3/19/2014 2:59:02 PM
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.977 S/m; ε_r = 52.177; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: ELI 4.0; Type: QDOVA001BA;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 4 Middle/Area Scan (31x161x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.0607 W/kg

Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.453 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 0.121 W/kg
SAR(1 g) = 0.057 W/kg; SAR(10 g) = 0.026 W/kg
Maximum value of SAR (measured) = 0.0695 W/kg

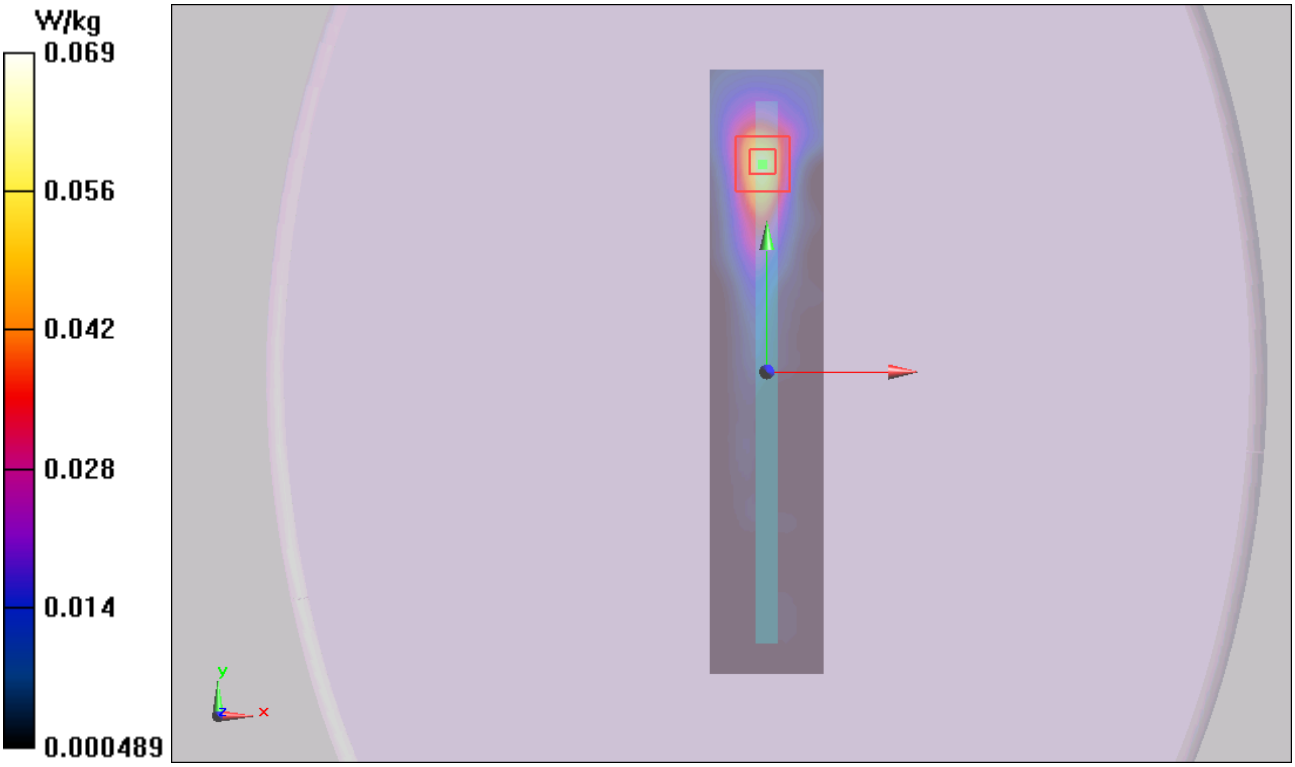


Figure 66 802.11b Test Position 4 Channel 6

802.11b Test Position 1 Low (1st Repeated SAR)

Date/Time: 3/19/2014 3:34:25 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.945 S/m; ε_r = 52.239; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Test Position 1 Low/Area Scan (101x161x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 1.13 W/kg

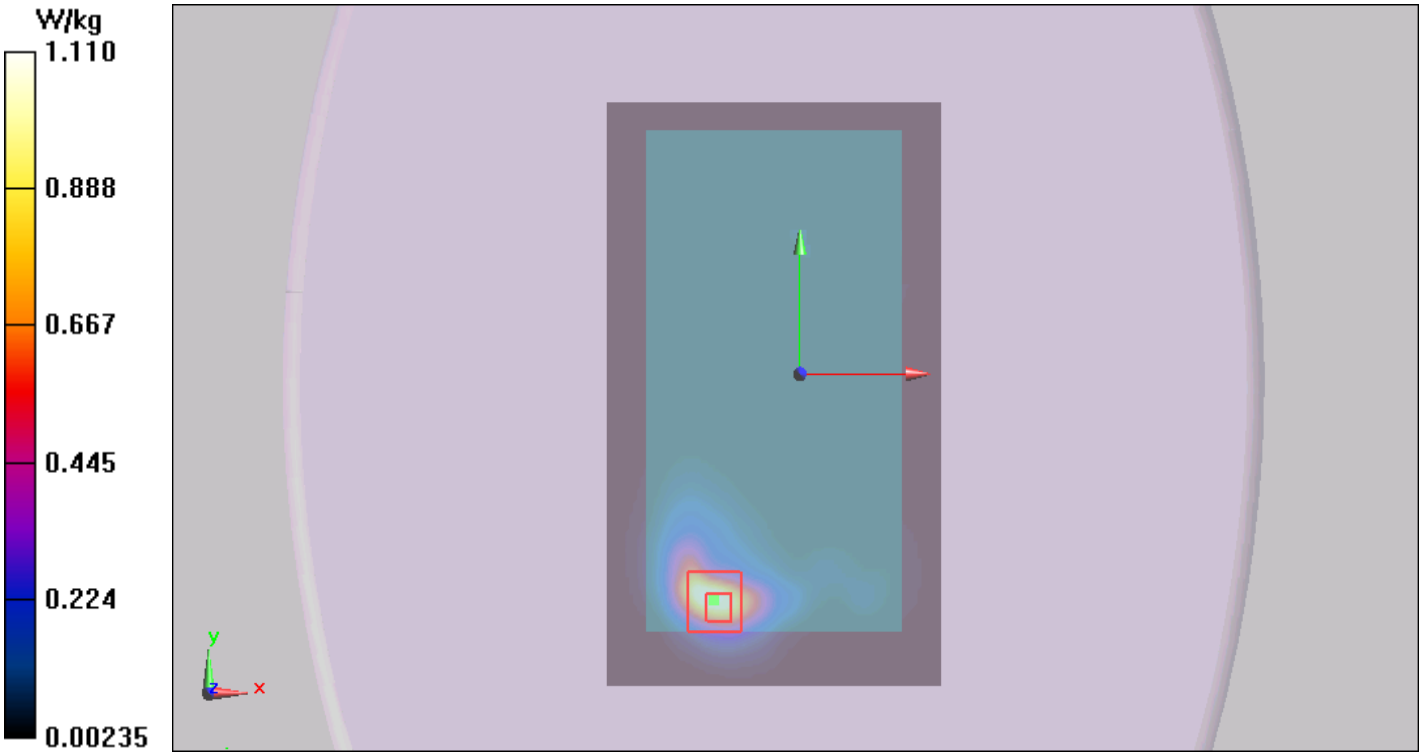
Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.082dB

Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 0.939 W/kg; SAR(10 g) = 0.366 W/kg

Maximum value of SAR (measured) = 1.11 W/kg



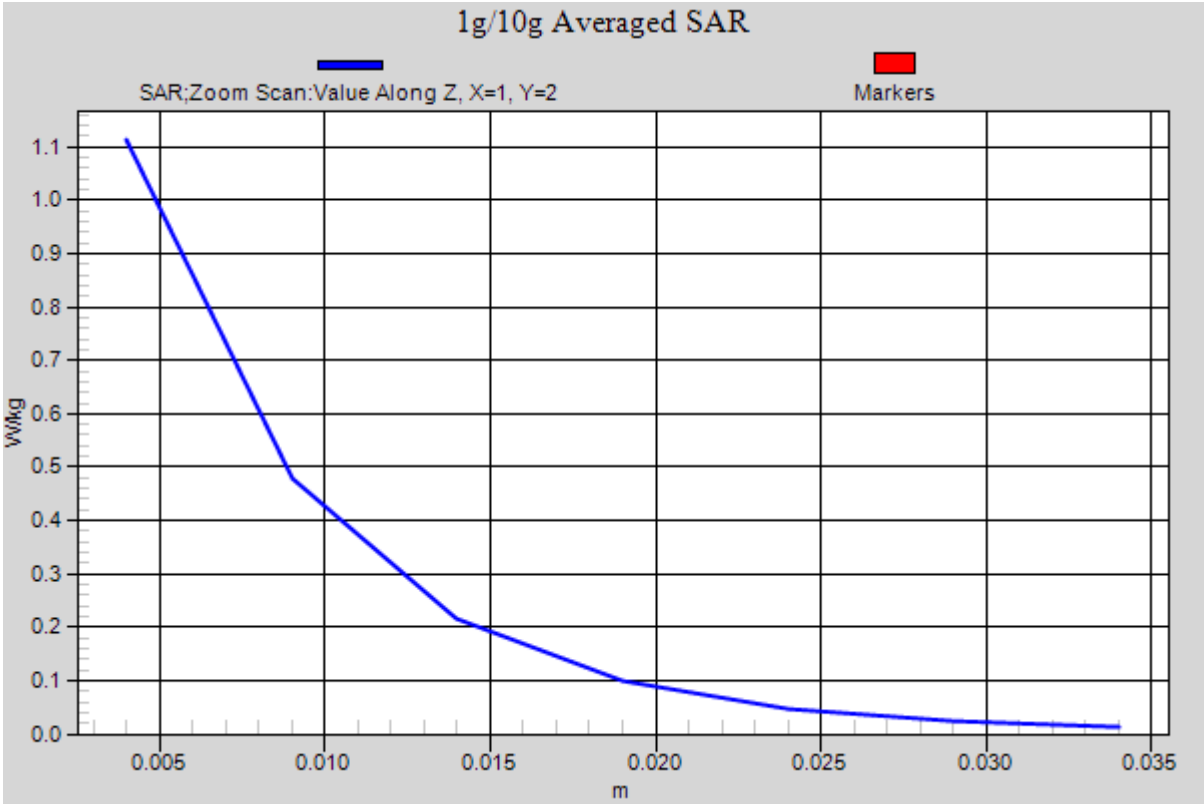


Figure 67 802.11b Test Position 1 Channel 1

ANNEX D: Probe Calibration Certificate

In Collaboration with
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CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

ilac-MRA CNAS 校准 CNAS L0442

Client TA-ShangHai Certificate No: J13-2-2971

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3677
Calibration Procedure(s)	TMC-OS-E-02-195 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	November 28, 2013

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Power sensor NRP-Z91	101547	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Power sensor NRP-Z91	101548	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Reference10dBAttenuator	BT0520	12-Dec-12(TMC,No.JZ12-867)	Dec-14
Reference20dBAttenuator	BT0267	12-Dec-12(TMC,No.JZ12-866)	Dec-14
Reference Probe EX3DV4	SN 3846	03-Sep-13(SPEAG,No.EX3-3846_Sep13)	Sep-14
DAE4	SN 777	22-Feb-13 (SPEAG, DAE4-777_Feb13)	Feb -14
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGeneratorMG3700A	6201052605	01-Jul-13 (TMC, No.JW13-045)	Jun-14
Network Analyzer E5071C	MY46110673	15-Feb-13 (TMC, No.JZ13-781)	Feb-14

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: November 29, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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E-mail: Info@emcite.com Http://www.emcite.com

Probe EX3DV4

SN: 3677

Calibrated: November 28, 2013

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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E-mail: Info@emcite.com Http://www.emcite.com

DASY – Parameters of Probe: EX3DV4 - SN: 3677

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.38	0.44	0.38	±10.8%
DCP(mV)[B]	99.8	100.9	101.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	93.3	±2.6%
		Y	0.0	0.0	1.0		101.7	
		Z	0.0	0.0	1.0		92.1	

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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E-mail: Info@emcite.com Http://www.emcite.com

DASY – Parameters of Probe: EX3DV4 - SN: 3677

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.94	9.94	9.94	0.16	1.13	±12%
850	41.5	0.92	9.41	9.41	9.41	0.11	1.47	±12%
1750	40.1	1.37	8.22	8.22	8.22	0.14	2.11	±12%
1900	40.0	1.40	8.15	8.15	8.15	0.14	2.34	±12%
2100	39.8	1.49	7.87	7.87	7.87	0.13	3.21	±12%
2450	39.2	1.80	7.64	7.64	7.64	0.39	0.95	±12%
5200	36.0	4.66	5.73	5.73	5.73	0.95	0.62	±13%
5300	35.9	4.76	5.68	5.68	5.68	0.87	0.67	±13%
5500	35.6	4.96	5.62	5.62	5.62	0.97	0.62	±13%
5600	35.5	5.07	5.29	5.29	5.29	0.89	0.63	±13%
5800	35.3	5.27	5.29	5.29	5.29	1.02	0.61	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

In Collaboration with
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CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
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E-mail: Info@emcite.com Http://www.emcite.com

DASY – Parameters of Probe: EX3DV4 - SN: 3677

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.72	9.72	9.72	0.11	1.97	±12%
850	55.2	0.99	9.51	9.51	9.51	0.15	1.55	±12%
1750	53.4	1.49	7.77	7.77	7.77	0.14	3.23	±12%
1900	53.3	1.52	7.63	7.63	7.63	0.15	2.81	±12%
2100	53.2	1.62	7.97	7.97	7.97	0.16	4.09	±12%
2450	52.7	1.95	7.61	7.61	7.61	0.45	0.92	±12%
5200	49.0	5.30	4.72	4.72	4.72	0.66	1.10	±13%
5300	48.9	5.42	4.67	4.67	4.67	0.64	1.19	±13%
5500	48.6	5.65	4.34	4.34	4.34	0.73	0.80	±13%
5600	48.5	5.77	4.29	4.29	4.29	0.74	0.81	±13%
5800	48.2	6.00	4.46	4.46	4.46	0.78	0.80	±13%

[C] Frequency validity of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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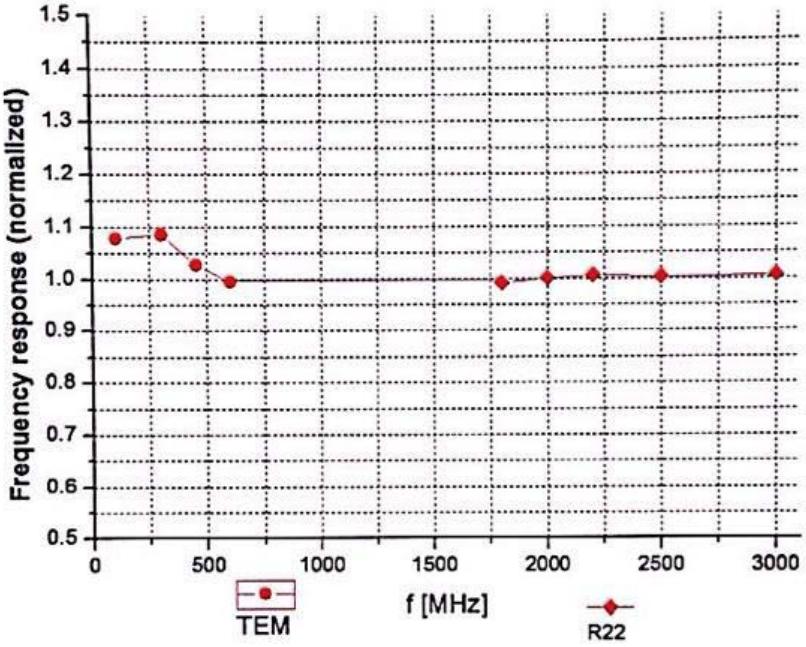
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.5% (k=2)

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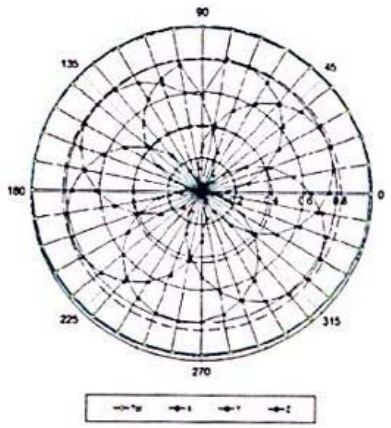
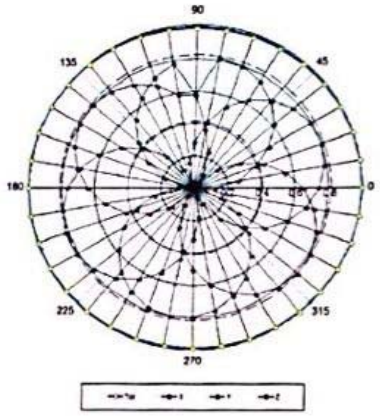
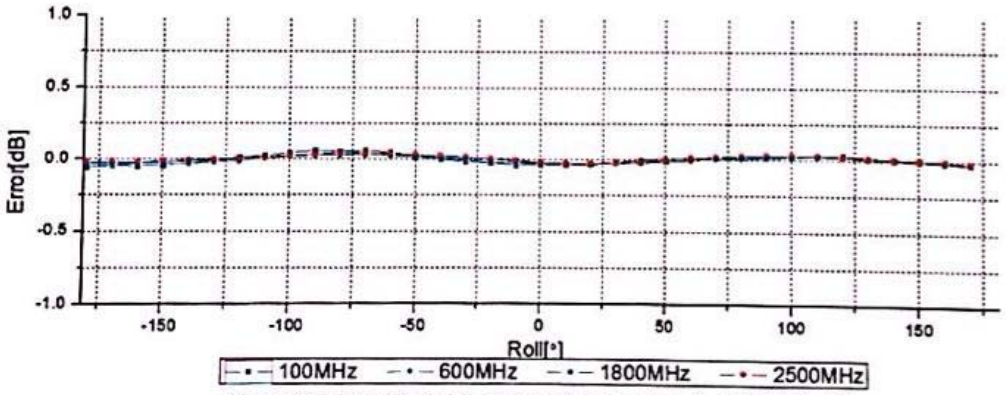
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±0.9% (k=2)

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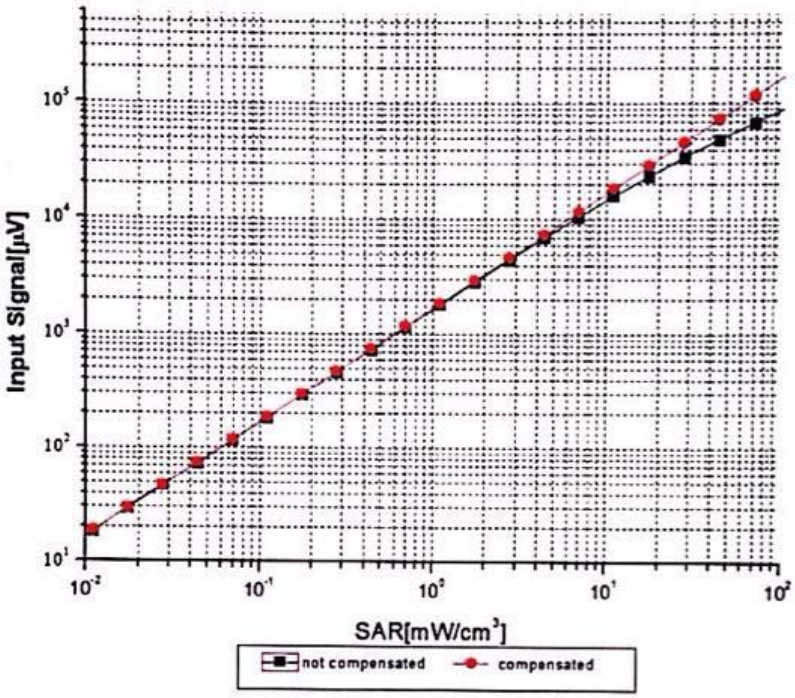
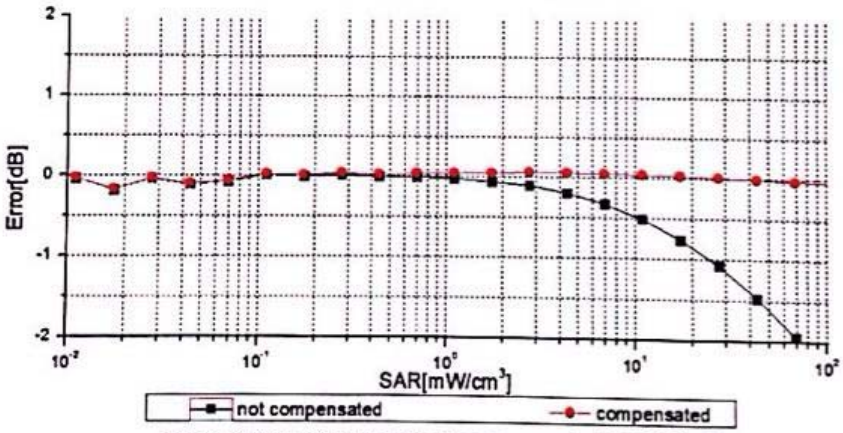
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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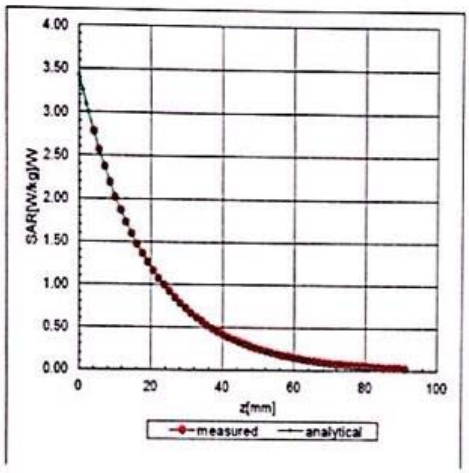
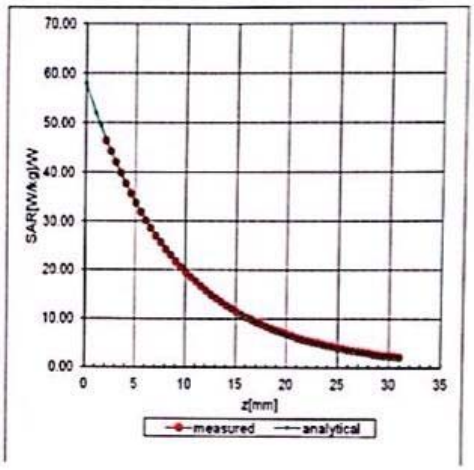
Conversion Factor Assessment

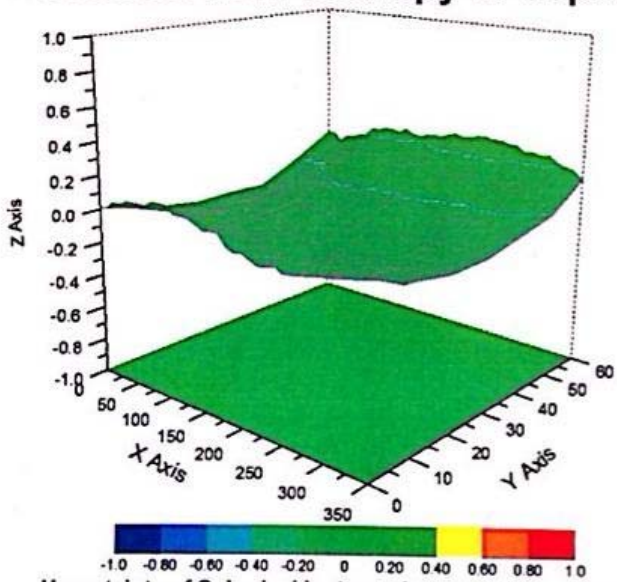
f=850 MHz, WGLS R9(H_convF)



f=2450 MHz, WGLS R26(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

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DASY - Parameters of Probe: EX3DV4 - SN: 3677

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	117
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	2mm

ANNEX E: D835V2 Dipole Calibration Certificate

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client TA-Shanghai (Auden)

Certificate No: D835V2-4d020_Aug11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d020
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 26, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.34 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.46 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.26 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 3.1 jΩ
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω - 5.4 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 22, 2004

DASY5 Validation Report for Head TSL

Date: 25.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

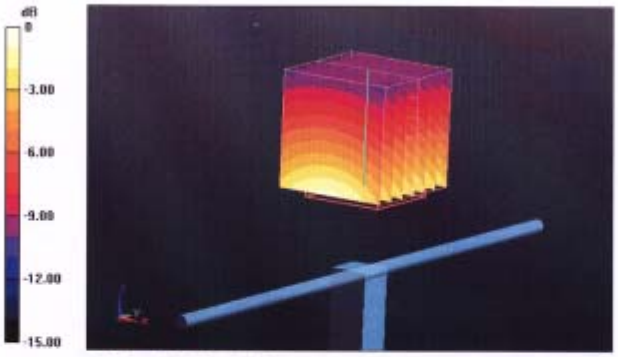
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

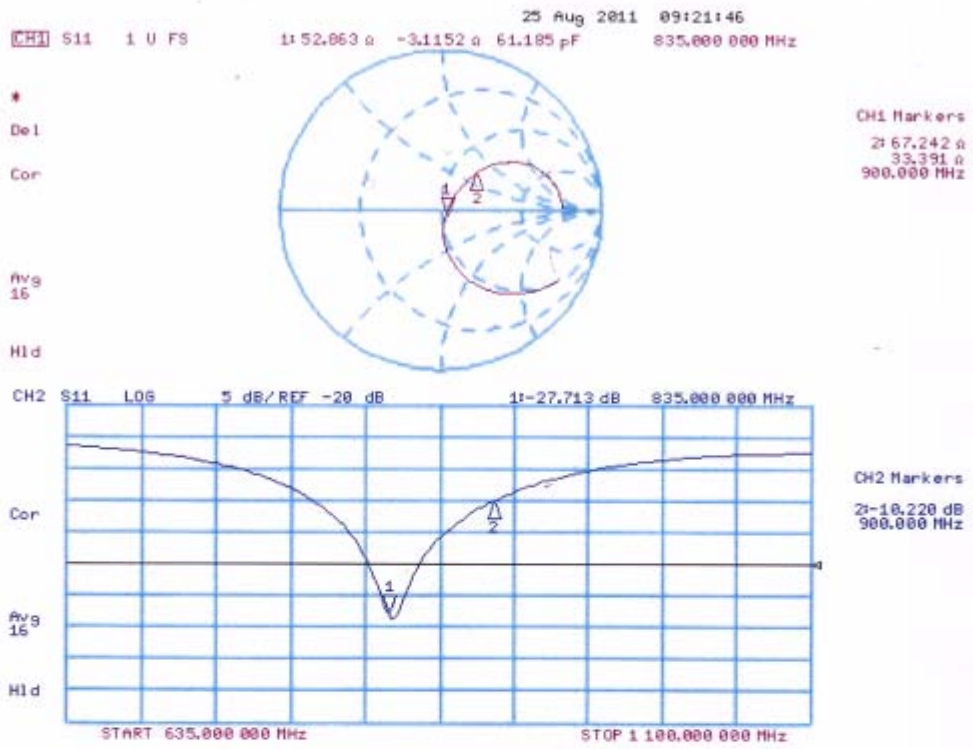
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.930 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.421 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

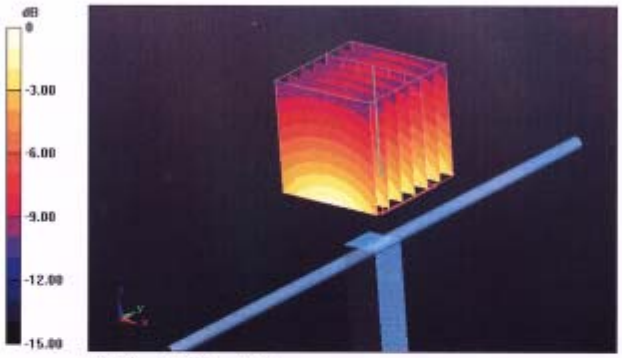
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

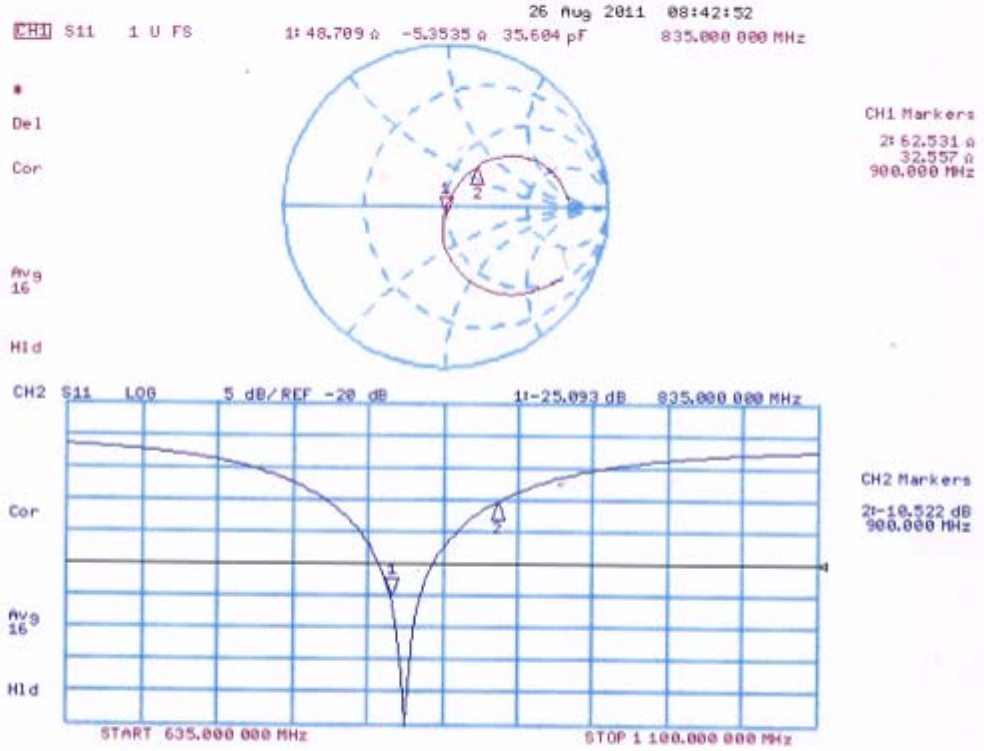
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.406 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.509 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.827 mW/g



0 dB = 2.830mW/g

Impedance Measurement Plot for Body TSL



ANNEX F: D1900V2 Dipole Calibration Certificate

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client TA-Shanghai (Auden)

Certificate No: D1900V2-5d060_Aug11

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d060
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 31, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 31, 2011

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.3 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.1 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.57 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.55 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6 Ω + 7.5 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω + 7.9 jΩ
Return Loss	- 21.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 10, 2004

DASY5 Validation Report for Head TSL

Date: 30.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

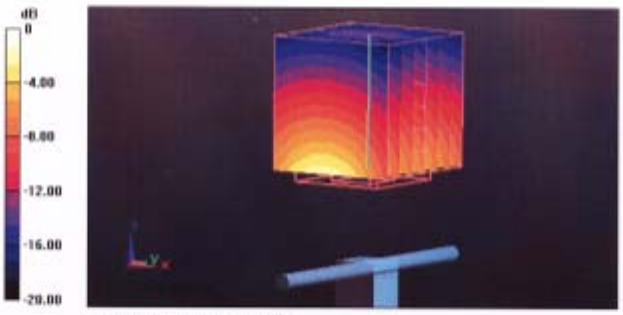
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

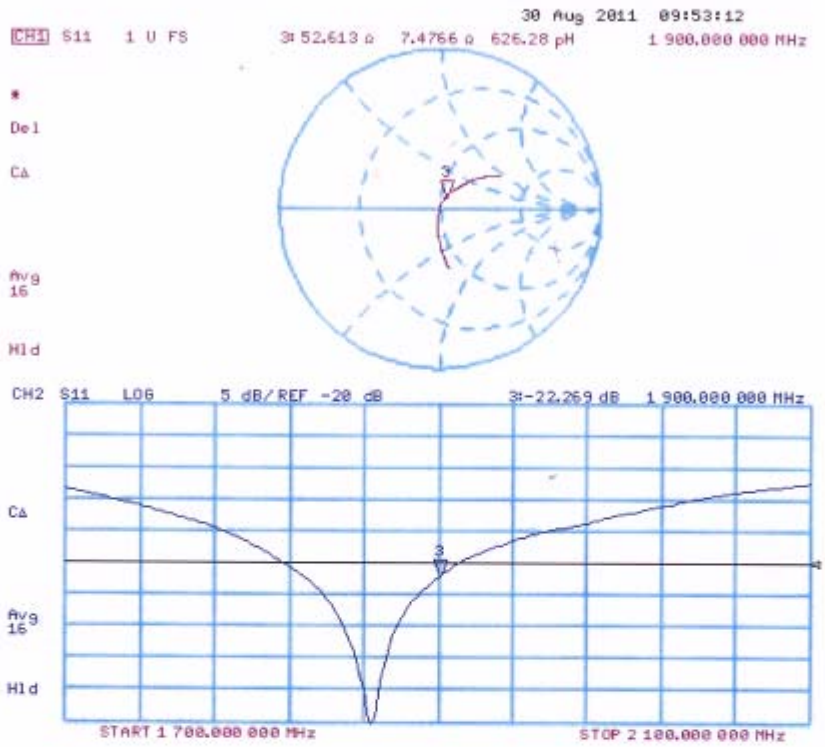
- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.636 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 18.535 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.600 mW/g



0 dB = 12.600mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 31.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

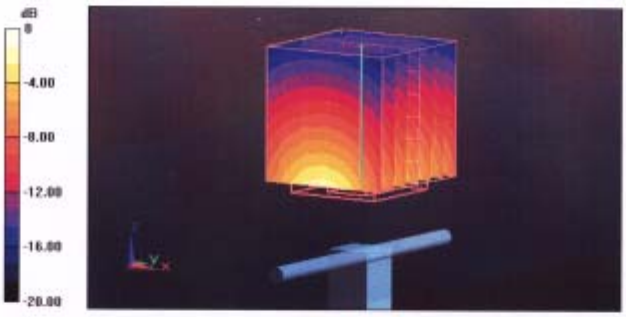
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

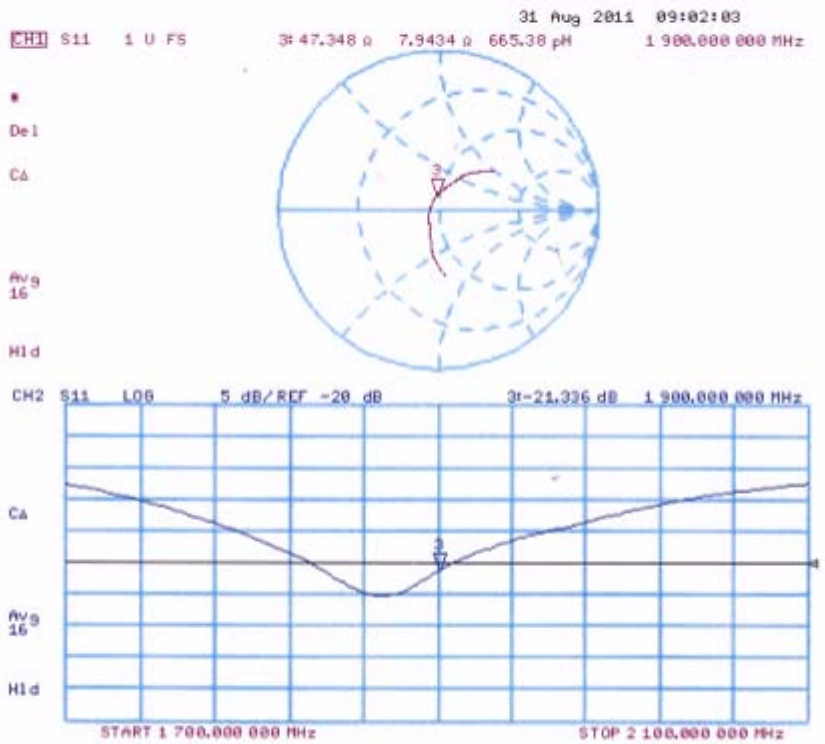
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.435 V/m; Power Drift = -0.0099 dB
Peak SAR (extrapolated) = 18.663 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.55 mW/g
Maximum value of SAR (measured) = 13.397 mW/g



0 dB = 13.400mW/g

Impedance Measurement Plot for Body TSL



ANNEX G: D2450V2 Dipole Calibration Certificate

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client TA-Shanghai (Auden)

Certificate No: D2450V2-786_Aug11

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 786
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 29, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 29, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.4 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.41 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.4 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.4 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.4 Ω + 3.5 jΩ
Return Loss	- 29.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 06, 2005

DASY5 Validation Report for Head TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

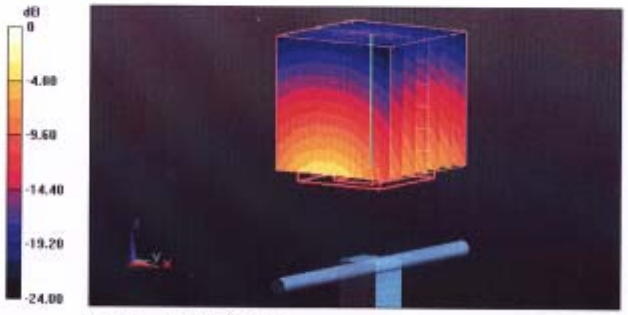
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

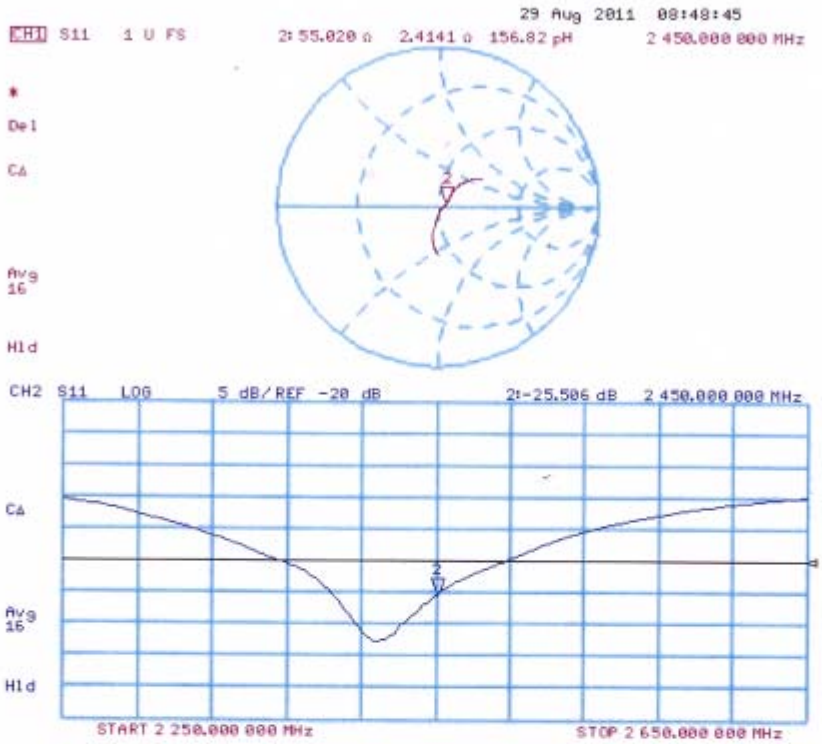
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.5 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 28.303 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.41 mW/g
Maximum value of SAR (measured) = 17.561 mW/g



0 dB = 17.560mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 29.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

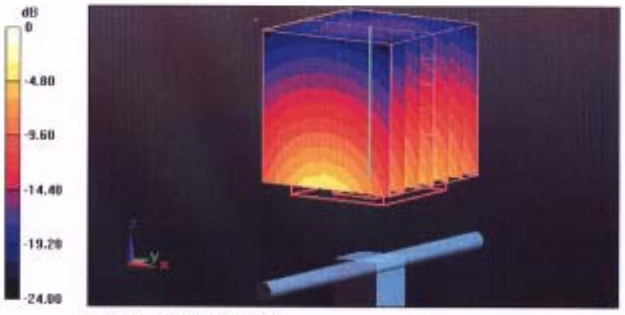
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

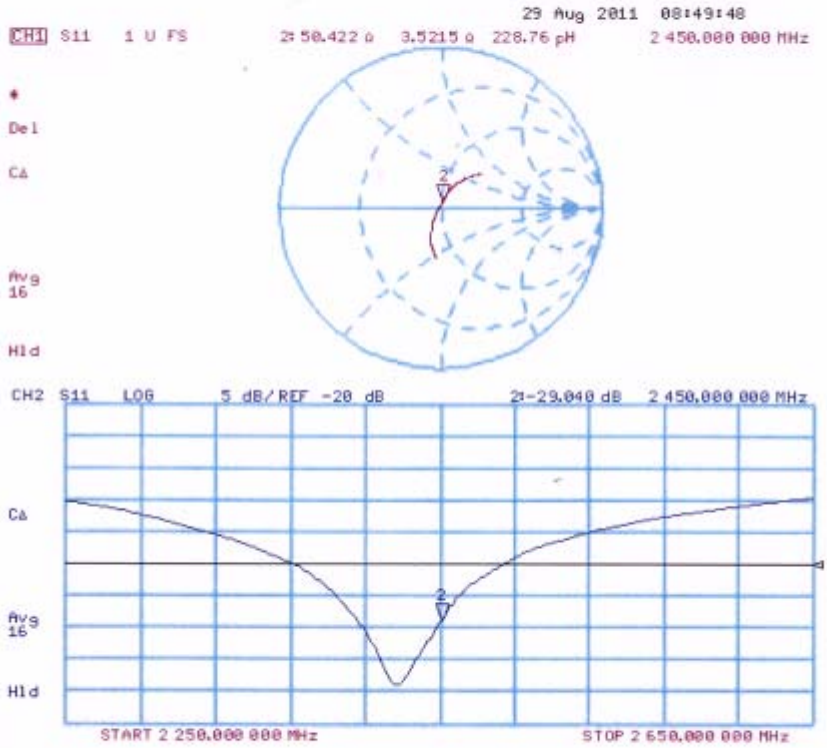
- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.118 V/m; Power Drift = 0.0072 dB
Peak SAR (extrapolated) = 27.129 W/kg
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.1 mW/g
Maximum value of SAR (measured) = 17.387 mW/g



0 dB = 17.390mW/g

Impedance Measurement Plot for Body TSL



ANNEX H: DAE4 Calibration Certificate

In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

ilac-MRA CNAS 校准 CNAS L0442

Client : TA(Shanghai) Certificate No: J14-2-0052

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 1317
Calibration Procedure(s)	TMC-OS-E-01-198 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	January 16, 2014

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Documenting Process Calibrator 753	1971018	01-July-13 (TMC, No:JW13-049)	July-14

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: January 16, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratoty.

In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

Glossary:

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.058 ± 0.15% (k=2)	404.060 ± 0.15% (k=2)	403.954 ± 0.15% (k=2)
Low Range	3.99002 ± 0.7% (k=2)	3.99910 ± 0.7% (k=2)	3.98303 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	119° ± 1°

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199996.94	-1.27	-0.00
Channel X	+ Input	20000.14	-0.07	-0.00
Channel X	- Input	-19997.83	3.06	-0.02
Channel Y	+ Input	199996.34	-1.76	-0.00
Channel Y	+ Input	19997.45	-2.66	-0.01
Channel Y	- Input	-20000.85	0.11	-0.00
Channel Z	+ Input	199999.43	1.31	0.00
Channel Z	+ Input	19998.09	-2.03	-0.01
Channel Z	- Input	-20000.38	0.66	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.20	-0.38	-0.02
Channel X	+ Input	201.23	0.09	0.04
Channel X	- Input	-197.80	0.90	-0.45
Channel Y	+ Input	2000.37	-0.14	-0.01
Channel Y	+ Input	200.23	-0.93	-0.46
Channel Y	- Input	-199.71	-0.91	0.46
Channel Z	+ Input	2000.07	-0.47	-0.02
Channel Z	+ Input	200.24	-0.94	-0.47
Channel Z	- Input	-199.53	-0.70	0.35

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	10.10	8.39
	- 200	-6.31	-7.87
Channel Y	200	7.67	7.42
	- 200	-9.57	-9.68
Channel Z	200	2.03	1.67
	- 200	-2.67	-3.15

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	5.61	-1.03
Channel Y	200	9.77	-	7.17
Channel Z	200	9.96	6.56	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15897	16637
Channel Y	16146	15425
Channel Z	16377	16752

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.62	-0.20	1.36	0.34
Channel Y	-0.89	-1.83	-0.02	0.33
Channel Z	-0.59	-2.34	1.15	0.60

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9